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A TEMPORARY POLAR CAMP

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## A TEMPORARY POLAR CAMP

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by

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### ABSTRACT

A temporary polar camp was developed to provide comfortable living conditions for periods up to 5 years in the Arctic and Antarctic. The camp design includes structures, air conditioning, water supply, sanitation, and other facilities integrated to form a unified functional component. The basic camp was designed for 50-man occupancy and expansion in 50-man increments to a 200-man capacity. Each man is provided with an individual room. Double bunks may be used, with two men sharing a room, to increase the camp capacity for short periods.

The building unit is the Modified T-5, variously outfitted for use as quarters, messing, galley, utilities, administration, communications, recreation, medical, head, laundry, and storage facilities. A duplex concept is used by which two building units are joined end to end by a service core which houses an air-conditioning system, head, and laundry, to form a basic building. A T-5M maintenance shelter is provided for maintenance of camp equipment.

The component parts of the packaged camp are lightweight and compact for transport by C-130 or other aircraft. All components are prefabricated for fast, easy erection even under the extreme weather conditions prevalent in polar regions.

Specifications and reduced scale drawings for the camp have been published in NCEL Technical Note N-540, "Specifications for a Temporary Polar Camp."

Qualified requesters may obtain copies of this report from DDC.  
The Laboratory invites comment on this report, particularly on the  
results obtained by those who have applied the information.

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## PART I. INTRODUCTION

Comfortable living conditions in polar regions are essential for high morale and consequent productiveness of a work force. This comfort must be provided by well-planned, well-integrated camps, with building components which can be quickly erected and outfitting and utility systems which can be quickly installed. Erection time is especially critical where rapid protection is required and the cost of supporting personnel is high.

Past developments for improving living conditions in polar regions have been directed toward individually improving camp structures, air conditioning, water supply, sanitation, and other facilities. Separately, these developments have materially improved habitation in the cold regions, but little progress has been made toward developing adequate packaged camps for these regions. It is recognized that no single camp design will fill all of the occupational requirements. However, experience in both the Arctic and Antarctic has shown that packaged camps would fill most of the needs for pioneer and temporary occupancy of any polar area. Further, the availability of such camps would simplify the logistics of occupancy and with proper design should improve the living conditions.

The development of a small pioneer camp for initial phases of occupancy is described in NCEL Technical Report R-267.<sup>1</sup> This report describes a larger camp designed for longer occupancy.

A review of past and existing polar camps and stations showed that a packaged camp of 50- to 200-man size with a useful life of 2 to 5 years would satisfy the requirements for temporary occupancy at most locations. As a result, a general-purpose surface camp was developed based on the concept of a basic 50-man packaged component expandable in 50-man increments. The camp is designed for a minimum life expectancy of 5 years and is adaptable to all types of polar terrain and climatic conditions. The design is directed toward comfortable occupancy, but is suitable for limited periods of crowded occupancy.

The plan provides for the camp facilities and the structures to house these facilities, the camp layout and orientation, and the necessary outfitting and utilities, all integrated into a unified complex. All components are prefabricated for easy erection and are lightweight and compact for shipment by C-130 or other aircraft.

The criteria are detailed in Appendix A. Specifications and reduced scale drawings have been published in NCEL Technical Note N-540.<sup>2</sup> It is recognized that revisions will be required as prototypes of components are evaluated and as technological advances make new materials and methods available.

## PART II. STRUCTURES AND OUTFITTING

All structures in the camp are of prefabricated, knockdown construction. The same basic type of structure is used to house all major facilities. The design provides for a maximum use of modular construction and a maximum standardization of components, outfitting, and utilities.

### BASIC BUILDING

In the initial phases of development of the camp it was decided to make the primary buildings uniform in size where feasible. This would permit the use of similar heating systems and other utilities. Identical mechanical equipment would allow interchangeability of parts. Construction of buildings and installation of utility systems would be simplified by the similarity of each unit.

The type of building for the camp was established in the design criteria as the Army prefabricated arctic building, Models T-5, Modified T-5, and T-5M. These buildings are constructed of 3-inch-thick, insulated, timber and plywood panels. The panels are 4 feet wide, permitting expansion of the building length on a 4-foot module. The roof panels are supported by steel trusses or timber beams which span the width of the building at the center of each wall panel. Wall panels are available with or without a window. The windows are triple-glazed clear acrylic with silica gel in the air spaces to absorb moisture. The door panel is interchangeable with all wall panels, but is normally placed at the center of each endwall. These buildings were designed for a snow load of 50 pounds per square foot and a wind load of 100 miles per hour.

The 20-foot-wide T-5 has been widely used for temporary-type construction in polar regions and found to be easily erected, structurally adequate, and very comfortable. However, lengthening the building to provide larger floor space makes it inefficient and awkward to arrange. To overcome this a modified T-5 building unit,<sup>3</sup> which is 28 feet wide, was developed using the same type of construction (Figures 1 and 2). Another modification of the T-5 is a 28-foot-wide building with a 12-foot ceiling, a heavy-duty floor, and a garage door. This building was developed to be used as a maintenance shop, and was designated T-5M.<sup>4</sup>

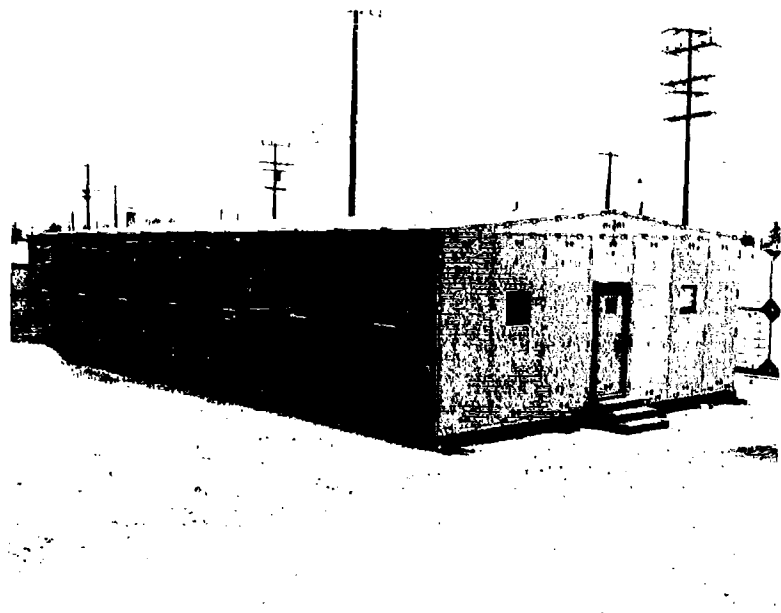


Figure 1. Modified T-5 building exterior.



Figure 2. Modified T-5 building interior without ceiling and floor overlays.

## Concept

The duplex concept has been considered for polar camp design. Two buildings could be connected by a service core which would house the heating system, head, washroom, and laundry. Having these facilities in each duplex would be much more convenient than locating them in a separate building, and would simplify camp expansion as each duplex would be an independent unit. Use of the service core would centralize all fuel-consuming equipment, water supply, and sewage collection for each duplex.

A duplex consisting of two buildings placed side by side with a service core between them near one end, producing a U-shaped structure, has disadvantages which make it impractical for polar regions. Weathertight connections at the intersections of walls and roofs are difficult to make, and the unit could not be oriented in most locations to minimize drifting of snow in the partially enclosed area between the buildings.

A duplex comprised of two buildings placed on the same longitudinal axis and connected end to end by a service core, using standard building panels for constructing the service core, is more practical. The two buildings would be joined to form one long unit by eliminating one end of each building and using intermediate panels to connect the two. The continuous walls and roof would alleviate the problem of providing weathertight connections at intersections, and would result in a simple rectangular structure which would not create special drift problems. This duplex arrangement was selected as the approach to be used in developing a basic building.

## Size

Preliminary layouts were made for all required facilities in order to establish the size of the basic building.

Mess Hall and Galley. This floor-space requirement for the 50-man camp is approximately 1450 square feet. If the camp is enlarged, additional messing area must be provided. This is the largest requirement in the camp, and thus establishes a minimum size for the basic building.

Administration and Communications. These two facilities can be combined in a building of the established minimum size in the 50- and 100-man camps. Separate buildings can be provided for each facility in the 150- and 200-man camps.

Recreation. A floor space of 1450 square feet can satisfactorily accommodate the recreation facility, including ship's store, darkroom, and library.

Quarters. The size of the quarters buildings can be varied depending on the number of bedrooms in each building.

Dispensary. The dispensary does not require 1450 square feet, but the excess space can be used for storage and converted to additional sick bay space and a dental facility if needed at a later date.

Based on the above floor-space requirements, the 28-foot-wide modified T-5 was selected as the building unit. The length for the building was established as 52 feet, which results in 1456 square feet of floor space.

A preliminary layout was also made for the service core. This layout included head, washroom, laundry, furnace room, and passageways between the two connected buildings and across their width. This layout revealed a length requirement of 24 feet for the service core. The two units, each 52 feet long, and service core, 24 feet long, result in a total duplex length of 128 feet.

This basic building was selected to house all facilities in the camp except the maintenance shop, which is housed in a 28- by 56-foot T-5M building.

#### Floor and Foundation

The live load for the buildings is based on a snow load of 50 pounds per square foot plus a floor live load which is dependent on the facility to be housed. The snow load is supported by the exterior walls and transferred directly to the foundations at the edges of the building. The design floor live load for normal occupancy is 50 pounds per square foot. The galley, utility, and storage buildings have a design floor live load of 150 pounds per square foot.

The dead load of the building consists of the building panels and trusses. All of the dead load with the exception of floor panels is supported by the foundations at the edges of the building.

Modified Floor. A study to determine the most economical foundation for the basic building revealed that the transverse foundation members required by the existing, Modified T-5 floor-panel design are impractical, as the total length of foundation members could be reduced by one-half if longitudinal foundation members were used. To permit use of an economical foundation system, a modified floor was designed for the building, using length reinforcement in the panels. With this modification the panels are identical to the standard T-5 floor panels, which are 4 feet wide by 10 feet long, with ribs spanning their length. Two are placed end to end across the 20-foot-wide building. The 28-foot-wide Modified T-5 requires an additional 8-foot panel.

The 10-foot panels with end support have a load-bearing capacity of 50 pounds per square foot. The 8-foot panels have even greater load-bearing capacity, as their span is shorter.

Foundation System. The foundation system designed consists of longitudinal beams supporting the ends of all floor panels and held in position by cross bracing. Open-web steel beams are used to lighten the system and to permit circulation of air under the building. In the galley, utilities, and storage areas where heavier floor loads are expected, additional beams are used at the midspan of the floor units, providing an actual load-bearing capacity of 200 pounds per square foot.

The foundation members are made in 16-foot lengths, which can be bolted end to end. Circular steel bars are used for cross bracing. The ends of the bars fit into slots in the beams and are secured by nuts on the threaded portion of the bar. Bearing support must be provided at each end of the 16-foot foundation members.

Bearing Support. The camp is designed to be flexible for installation at any location in polar regions. Underlying media for the buildings may be frozen ground, sea ice, or deep snow. Buildings may require only point support in some locations, but a spread footing or piles may be necessary in other locations. Because the bearing capacity of the underlying media is unknown until a specific location is determined, only point support for the foundations are indicated in the camp design. Footings must be designed to conform to local site conditions after the site is selected.

#### Partitions

Partitions were designed on a 4-foot module to conform to the dimensions of the basic building (Figure 3). The panels are slightly less than 4 feet wide to allow for the thickness of partitions at intersections. A 2-inch by 2-inch post is used at all intersections of the 2-inch-thick panels. Partition panels which butt against the exterior walls are slightly narrower than the panels used in the center of the building to allow for the thickness of the exterior wall. These two panel sizes satisfy the requirement for partitions any place in the building. Within these dimensions, a variety of special panels are provided with cutouts for doors, windows, and heating-system ducts.

Wood was selected as the material for construction of the partitions. A panel of wood framing covered on both faces with plywood is economical, lightweight, and durable. The panels are insulated for acoustic purposes. A discussion of the selection of materials is given in Appendix D.



Figure 3. Partitions installed in the prototype quarters building.

The final partition design includes 12 panels to satisfy all conditions. One-quarter-inch plywood is nailed and glued to both sides of 1-1/2-inch framing. A tongue is provided in both vertical edges of all panels except the panels designed to butt against an exterior wall. Matching grooves are provided in all four sides of the posts, permitting either a continuous partition, a corner, or a three-way or four-way intersection at any post.

Galvanized-iron brackets are nailed to the top of the panels and posts and bolted to the lower cord of the roof truss. All transverse partitions are directly under a truss. Longitudinal partitions cannot be bolted to a truss, but the posts which hold each vertical edge of the panel are secured to a truss.

A 1- by 1-1/2-inch aluminum angle is used for trim at the bottom of panels. Holes are provided in both legs of the angles for nailing them to the partitions and floor. Angles are shipped in 12-foot lengths and cut to size in the field.



A wood section is used for trim at the ceiling. This trim is also shipped in 12-foot lengths and cut to size in the field. It is installed by nailing to the partition panels.

#### SERVICE CORE

The two building units comprising each duplex are joined end to end by a service core (Figure 4). The furnace is identical for all basic buildings and is contained in a separate room in the service core except in the storage — utilities building. The service core also includes bath and laundry facilities and a separate head with recirculating toilets. The bath, laundry, and toilets are eliminated in the storage — mess hall and galley building and the storage — utilities building. The bath facility includes three lavatories, two showers, one washer, and one dryer. Each head has two toilet bowls and one urinal.

The service core was planned with a passageway through the center connecting the building units and a passageway across the width of the building connecting exterior doors. This provides access from outside near the center of both sides as well as at both ends of each basic building. The passageway across the building can be used for camp traffic circulation if the service cores are connected by tunnels.

#### BUILDINGS AND OUTFITTING REQUIRED

Eight basic building arrangements were developed to house the various facilities. Six of these are used in the 50- and 100-man camps. The remaining two are used only in the 150- and 200-man camps. The building titles and number required for each increment of camp capacity are shown in Table I.

Detailed outfitting and allowance lists for each component with weights, cubes, and costs are presented in Appendix B. A summary is given in Table II. This summary and the detailed lists do not include the communications equipment presented in Appendix C.

#### BUILDING NO. 1, QUARTERS — QUARTERS

This building (Figure 4) provides individual rooms for 11 men on each end for a total of 22 men. The rooms are 8 by 12 feet with a gross area of 96 square feet. Walls and partitions subtract approximately 5 square feet, leaving a net area of 91 square feet. Each unit is also provided with a 12- by 16-foot lounge. The bedrooms and lounge are arranged on each side of a passageway which extends the length of the building at the longitudinal center.

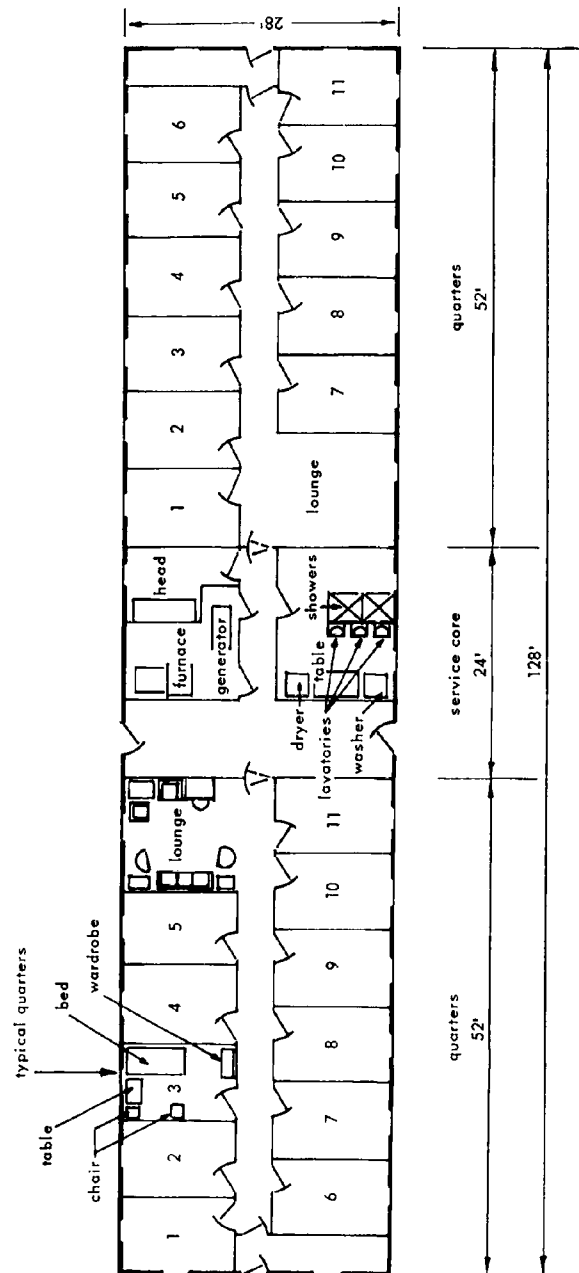


Figure 4. Building No. 1, quarters — quarters floorplan.

Table I. Basic Building Requirement

	50-Man	100-Man	150-Man	200-Man
Quarters — Quarters	1	3	5	7
Recreation — Quarters	1	1	2	2
Storage — Mess Hall and Galley	1	1	1	1
Storage — Utilities	1	1	1	1
Quarters — Administration and Communications	1	1	0	0
Quarters — Dispensary	1	1	1	1
Officers' Quarters — Quarters	0	0	1	1
Administration — Communications	0	0	1	1

The building is furnished with Federal stock items. Each bedroom contains a standard Navy bunk which can easily be converted to a double bunk, a 1-1/2- by 3-foot wardrobe, a writing table, and two chairs. The bedrooms are supplied with only one bed; however, double bunks may be used for two-man occupancy for short periods.

The lounges are furnished for conversation, reading, and card playing. The furniture includes a settee, two lounge chairs, lamp tables, a 30- by 48-inch card table, and six folding chairs.

The building has the standard service core with head, bath, laundry and furnace room.

#### BUILDING NO. 2, RECREATION — QUARTERS

The quarters unit and service core in this building (Figure 5) are identical to those in Building No. 1. One lounge and individual rooms for 11 men are provided.

Table II. Weights, Cubes, and Costs of Buildings, Outfitting, and Allowances for 50-Man Camp

Unit	Per Unit			Total Per Building or System		
	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
Building No. 1: Basic building Service core Enlisted quarters (2)	76,984 7,842 24,440	5,044 636 2,376	55,000 11,893 19,136	109,266	8,056	86,029
Building No. 2: Basic building Service core Enlisted quarters Recreation	76,984 7,842 12,220 5,864	5,044 636 1,188 767	55,000 11,893 9,568 7,259	102,910	7,635	83,720
Building No. 3: Basic building Heated storage Mess hall & galley	76,984 10,428 16,649	5,044 809 1,807	55,000 5,297 23,655	104,061	7,660	83,952
Building No. 4: Basic building Unheated storage Utilities	76,984 9,669 18,423	5,044 711 838	55,000 3,721 25,131	105,076	6,593	83,852
Building No. 5: Basic building Service core Administration & communications Officers' quarters (7 rooms)	76,984 7,842 7,215 8,713	5,044 636 814 958	55,000 11,893 5,696 7,416	100,754	7,452	80,005

Table II. Weights, Cubes, and Costs of Buildings, Outfitting, and Allowances for 50-Man Camp (cont'd)

Unit	Per Unit			Total Per Building or System		
	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
Building No. 6:						
Basic building	76,984	5,044	55,000	109,218	7,965	93,693
Service core	7,842	636	11,893			
Dispensary	12,172	1,097	17,232			
Enlisted quarters	12,220	1,188	9,568			
Maintenance shelter				69,260	3,883	43,560
Connecting tunnel units				3,500	1,000	2,000
Camp electrical distribution				1,500	300	1,500
Water supply & waste lines				1,500	700	2,000
Fuel distribution				16,000	2,500	3,000
Erection aids				1,191	126	1,761
TOTAL				724,236	53,870	565,072

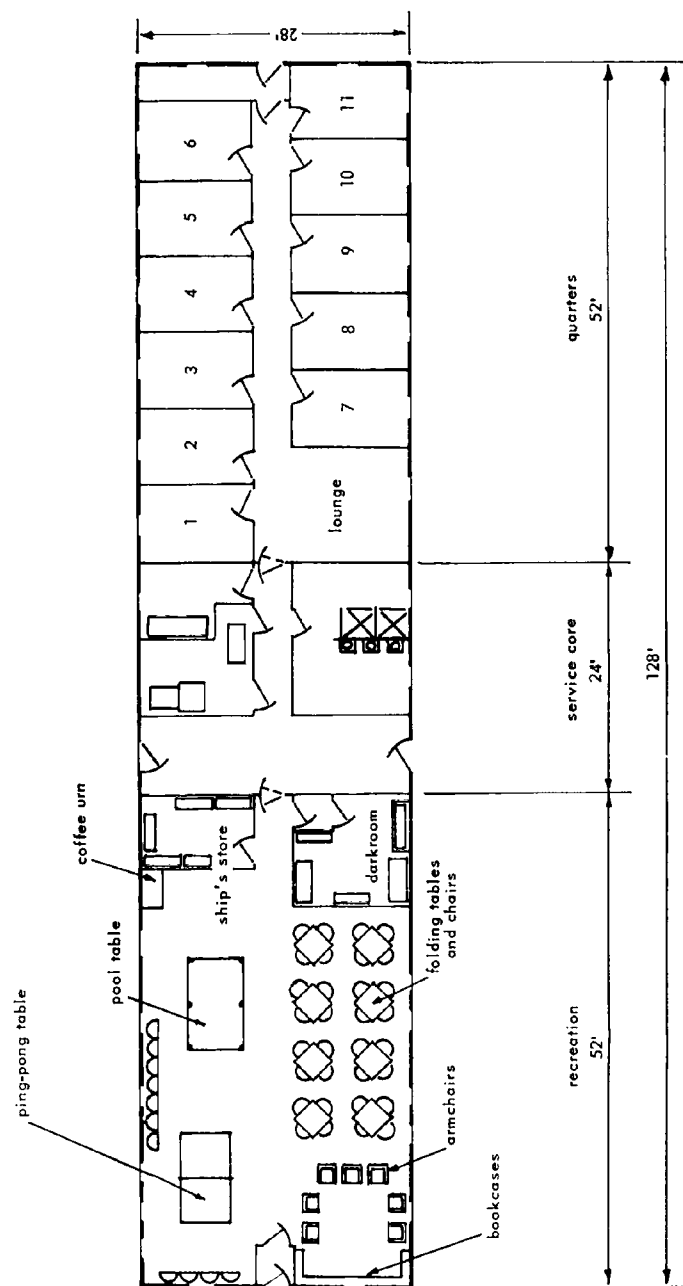


Figure 5. Building No. 2, recreation. — quarters floorplan.

The recreation unit in the opposite end of the building is planned for the use of the entire camp. This facility includes a ship's store and a completely equipped photographic laboratory. The main recreation area contains a pool table, a ping-pong table, four card tables, and lounge furniture. The lounge furniture is grouped in one corner around bookshelves which house the camp library. The card tables can be folded and moved from the area to provide space for arranging chairs for group meetings or movies. This recreation facility is designed to accommodate 100 men. When the camp is increased to a larger size, a second recreation facility is added. When two recreation facilities are available, one may be used for movies and the other for other activities.

The photographic laboratory is a 12- by 12-foot room. Entry to the room is through a 4- by 4-foot vestibule which serves as a light trap. The laboratory is used to accomplish the mission of the task force as well as for recreational purposes. It also serves as a projection room for movies. One partition panel is fitted with an opening for a projector. A collapsible screen may be placed at the opposite end of the building.

The ship's store is an 8- by 12-foot room. A window with a shelf serves as a counter. This window and the access door can be closed and locked. Steel shelving is provided for storage of supplies.

#### BUILDING NO. 3, STORAGE — MESS HALL AND GALLEY

One end of this building (Figure 6) is used for heated storage. A 12- by 12-foot room is provided for locked storage. The remainder of the storage area is one large room with metal shelves for storing supplies.

The head is eliminated from the service core and the resulting space is used for galley storage. The partitions for the bath and laundry room are installed, but no plumbing or equipment is used. This room is used as an officers' mess in the 150- and 200-man camps. It is used for galley storage in the smaller camps.

The galley is located along one side of the building, with a serving counter separating it from the messing area. A griddle, a deep-fat fryer, a dry hot-food table with electric heating units, and a cold-food cabinet are included in the serving counter. At the end of the counter a flaked-ice machine, a water station, and a double coffee urn with an 8-gallon capacity are accessible from the messing area. The double urn provides coffee at all times, including warming breaks during the day.

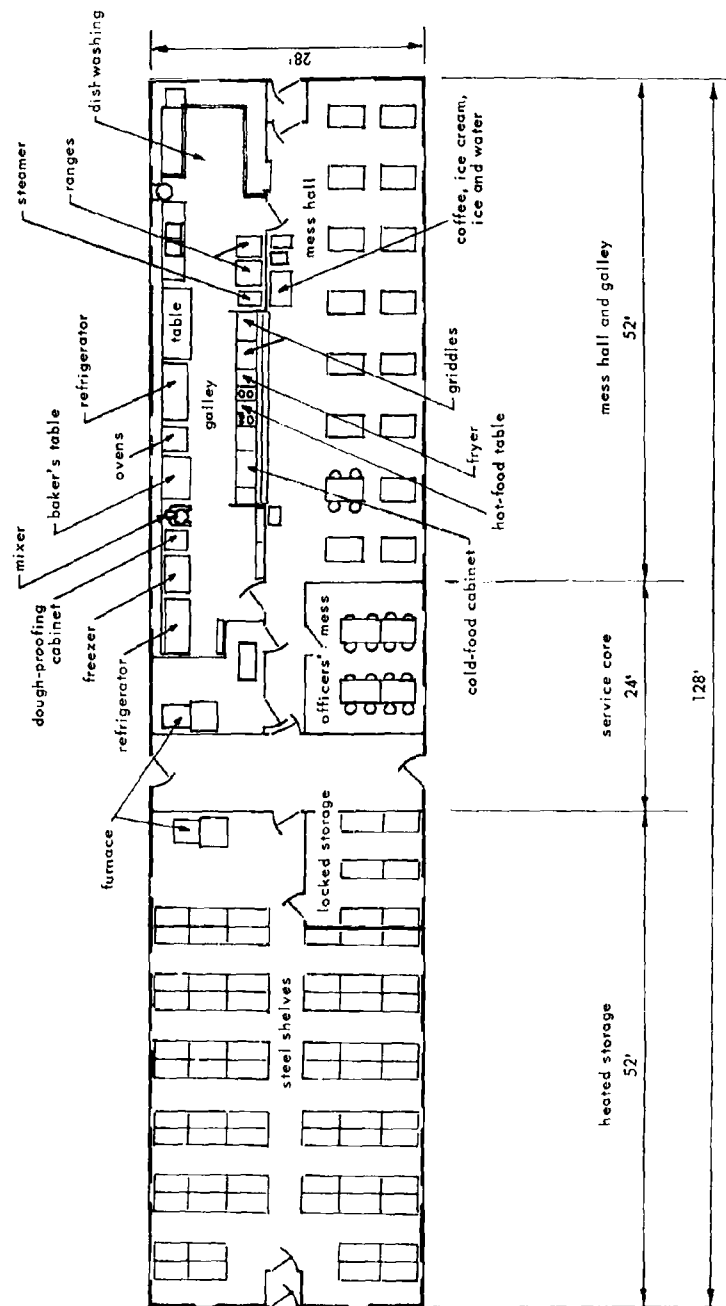


Figure 6. Building No. 3, storage — mess hall and galley floorplan.



A U-shaped dish table is located in one end of the galley, with a dishwasher in one corner. A double sink is at one end of the "U" for washing pots and pans. A pass-through window is provided for returning dirty dishes from the messing area. Shelves above the dish table provide storage for cooking utensils. Storage shelves are also under the tables.

The galley is completely equipped with electric appliances. One four-burner range is supplied with the 50- and 100-man camps. The larger camps are provided with one additional range. Three ovens which can be stacked are also provided. A separate steamer is used for cooking vegetables.

A refrigerator with a 65-cubic-foot capacity is used in the 50- and 100-man camps, with provision for an additional refrigerator for the larger camps. A separate freezer with a 40-cubic-foot capacity is provided. No additional freezer is added in the larger camps. An ice cream machine is provided in the serving line for self service.

The mess hall is furnished with four-man tables with swinging seats attached to the table legs. A seating capacity of 64 is provided in the main messing area. This is adequate for the 50- and 100-man camps. It is expected that the eating time in the 100-man camp will be over a long enough period for all personnel to eat even though they cannot be accommodated at one time. A separate officers' mess with 16 seats is provided in the larger camps, making a total seating capacity of 80 men.

#### BUILDING NO. 4, STORAGE — UTILITIES

One end of this building (Figure 7) provides a storage area similar to Building No. 3 except that no furnace and no separate locked storage room are included. It is one 28- by 52-foot room with an aisle through the center and storage shelves on either side.

All service core partitions except the main passageway partitions are eliminated in this building. The utilities section is extended to include the area normally occupied by the head, laundry, and furnace room. A furnace is placed in the building to provide heat while the building is being outfitted, but no duct is included. Waste heat from the generators will be more than sufficient to heat the building after they are put into operation. The furnace serves as a spare heating unit for the camp.

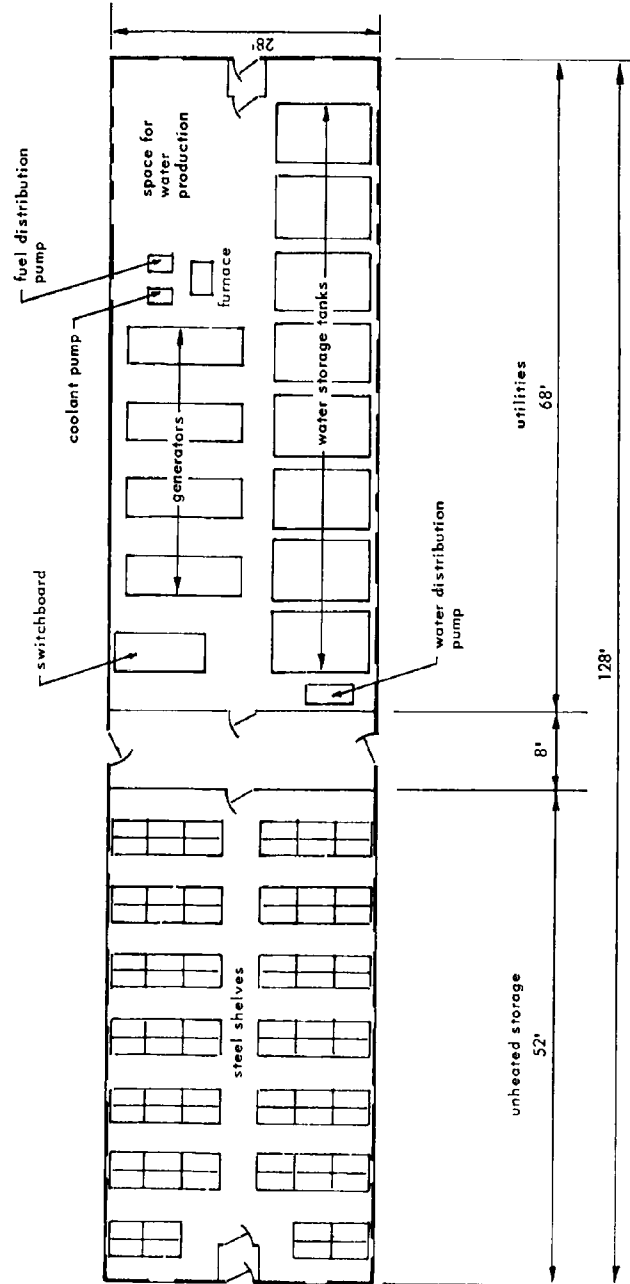


Figure 7. Building No. 4, storage — utilities floorplan.

The utilities area houses the water production and storage and the power generation facilities. Although water production is not included in the camp design, an area large enough for a snow melter or a distillation unit is provided at the end of the building. Eight water storage tanks with 1175 gallons capacity each are located along one wall in the 150- and 200-man camps. Four 100-kw generators are located on the opposite side of the building. A heavy-duty foundation is used under the entire building.

#### BUILDING NO. 5, ADMINISTRATION AND COMMUNICATIONS — QUARTERS

The administration and communications facilities share one section of this building (Figure 8) in the 50- and 100-man camps. The communications facility is provided with a 24- by 28-foot open area at the end of the building. No communications equipment is supplied in the camp design as the requirement varies considerably with the site location and mission of the camp. Information concerning communications equipment is provided in Appendix C. The administration area has a 12- by 12-foot office for the commanding officer, an 8- by 12-foot office for the executive officer, an 8- by 12-foot post office, and a 16- by 28-foot general office area. Desks, chairs, and filing cabinets are supplied for these areas. Shelves are provided in the post office for sorting mail. The post office has a pass-through window to the service core passageway so that personnel can pick up mail without entering the administration area. The post office must be locked to comply with Federal regulations.

The quarters section of this building has seven 12- by 12-foot rooms for individual officer's quarters. They are of ample size for double occupancy when required. The lounge is 12 by 16 feet. The building has the standard service core.

#### BUILDING NO. 6, QUARTERS — DISPENSARY

The quarters section and service core in this building (Figure 9) are identical to those in Building No. 1. One lounge and individual rooms for 11 men are provided.

The dispensary is partitioned to provide separate rooms for corpsman's quarters, a three-bed ward, an examination room, a pharmacy, a laboratory, a doctor's office, and a head with a bathtub. Space is provided for a dental operating room and an additional two-bed ward, but they are furnished and equipped only in the larger camps. This space is used for storage in the smaller camps.

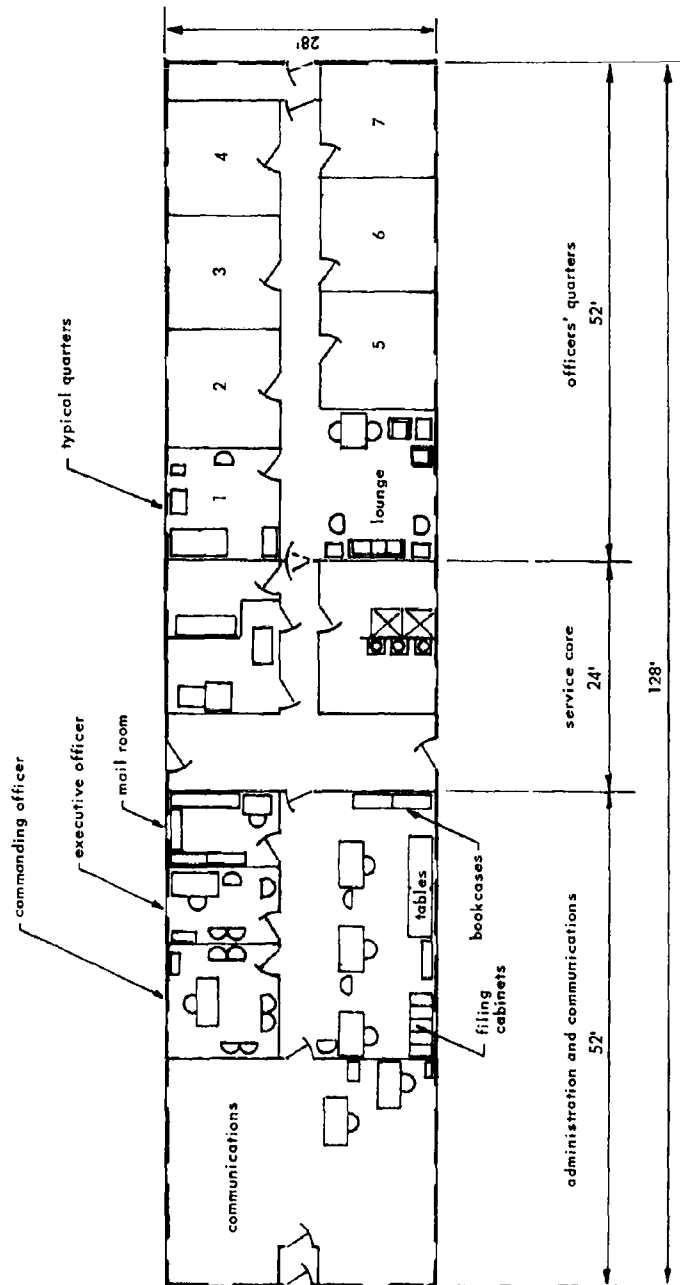


Figure 8. Building No. 5, administration and communications — quarters floorplan.

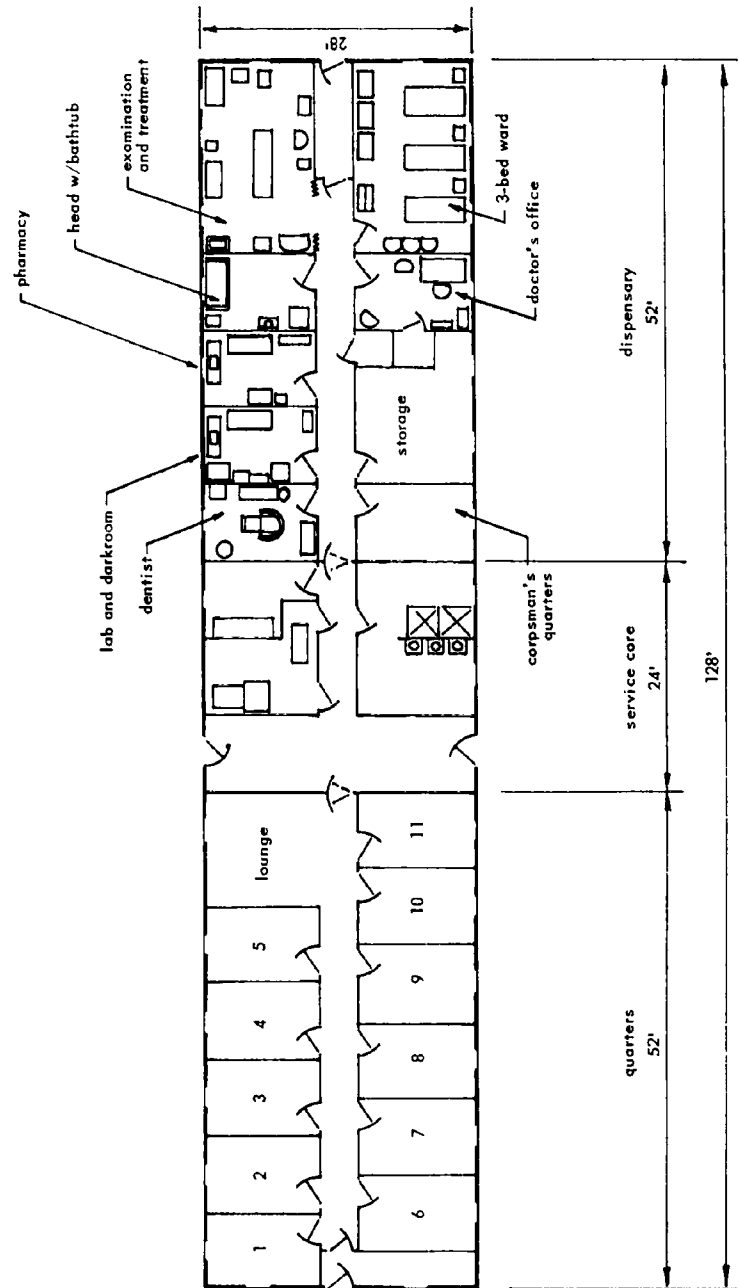


Figure 9. Building No. 6, quarters — dispensary floorplan.

The examination room has an examination table which can be used as an operating table for emergencies in which evacuation to a hospital is not feasible. An instrument table, instrument stand, medicine cabinet, resuscitator, sterilizer, scrub sink, and portable X-ray machine are provided in this room. An accordion-fold door 8 feet wide permits easy entry with stretchers. The vestibule in this building is 12 feet long for accommodating stretchers.

The three-bed ward is 12 by 20 feet. A wardrobe and a bedside table are provided for each man. Three folding chairs are available for visitors.

A head is required near the sick bay for ambulatory patients. The bathtub in this head also permits treatment for prolonged exposure to cold or immersion in freezing water. With a small submersible electric pump, the tub can be converted to a whirlpool bath. This is desirable for initial rewarming of freezing victims and is necessary for therapy of such cases for at least 1 to 2 months. The bathtub cannot be elevated, as patients may have difficulty climbing to a higher level, and a pump is required to empty it.

The pharmacy has a sink, a 7.6-cubic-foot refrigerator, and a safe for narcotics. A table and shelves provide work space and storage.

The laboratory is also a darkroom for developing X-ray film. Work space, X-ray equipment, and a sink are supplied.

The doctor's office is primarily for keeping records, although he may choose to examine patients there in some cases. A bookcase, filing cabinet, and desk are supplied. A 4- by 4-foot closet provides additional storage.

The corpsman's quarters is identical to the other enlisted quarters. The 8- by 12-foot room is furnished with a bed, writing table, wardrobe, and two chairs.

The dentist's room is 8- by 12-feet, and is equipped with one dental operating unit and necessary storage and work space. This equipment is supplied only in the 200-man camp. In the smaller camps the room is used for storage.

#### **BUILDING NO. 7, OFFICERS' QUARTERS — QUARTERS**

This building (Figure 10) is used only in the 150- and 200-man camps. Individual rooms for 14 officers and a 16- by 28-foot lounge are provided. All but one of the individual rooms are 12- by 12-feet and are adequate for double occupancy if necessary. The commanding officer's room is 12- by 16-feet. The standard service core with head, bath, laundry, and furnace room is provided.

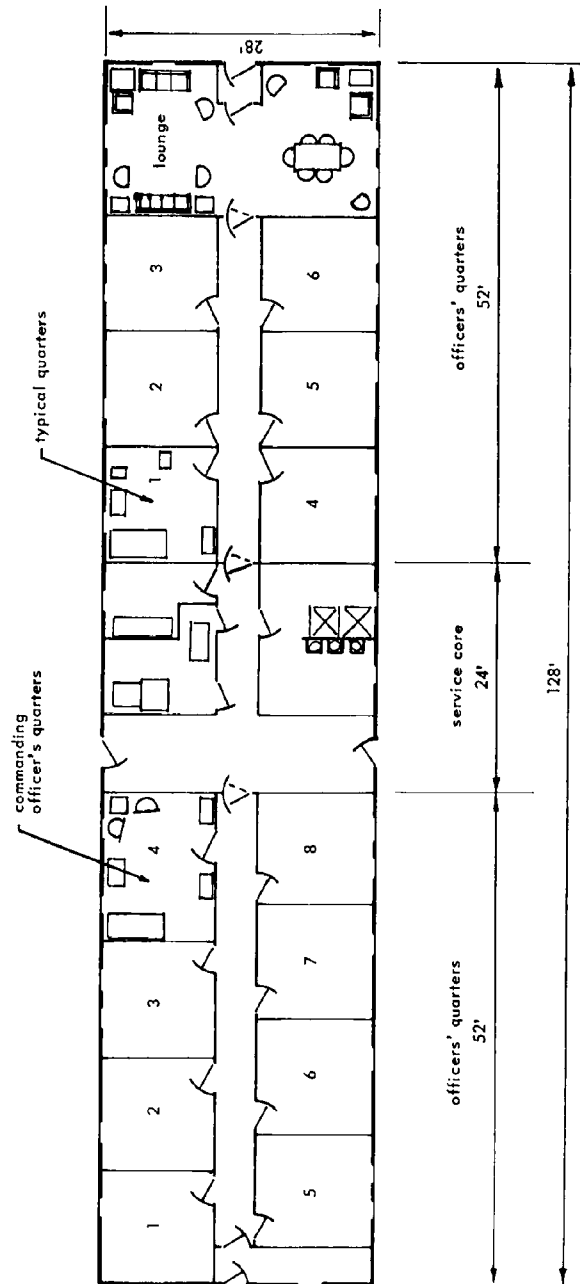


Figure 10. Building No. 7, officers' quarters — quarters floorplan.

## BUILDING NO. 8, ADMINISTRATION — COMMUNICATIONS

This building (Figure 11) is used only in the 150- and 200-man camps. If these camps are built by enlarging a 50- or 100-man camp, Building No. 5 is converted to be used as Building No. 8. This conversion requires no changing of partitions. The quarters' furniture must be eliminated and some office furniture added. The mail room remains in the same location. The administration area in Building No. 5 is used for communications offices in Building No. 8. The administration offices are located in the opposite end of the building. Five private offices, a reproduction room, an office-supplies room, and an open office area are provided. The floor plan has suggested usage for all of the rooms; however, the actual usage of these offices will depend on the requirements of the specific camp. The standard head, bath, laundry, and furnace room are provided in the service core.

## MAINTENANCE SHELTER

The 28- by 56-foot T-5M used for the maintenance shelter (Figure 12) is of the same type of construction as the basic building, but has a 12-foot ceiling, a heavy-duty floor, and garage doors at each end. Heavy equipment can be driven on the floor overlay through the longitudinal center of the building. The areas along each side are used as shops.

## TUNNELS

Tunnels are designed to connect the buildings in the camp when site conditions necessitate their use. They may not be necessary in some locations where snowdrift is not a problem.

The tunnel consists of corrugated-aluminum arched sections 5 feet 5 inches at the base, placed on wood floor panels (Figure 13). The sections can be nested for shipment. Canvas closure bands are used to connect the tunnels to the buildings. To make this connection, the slope of the tunnel must be limited to less than 1 in 8. Tie-downs are provided at 12-foot spacing between the buildings. No provision is made for intersecting tunnels as the camp layout selected does not require intersections. The selection of the tunnel size is discussed in Appendix D.



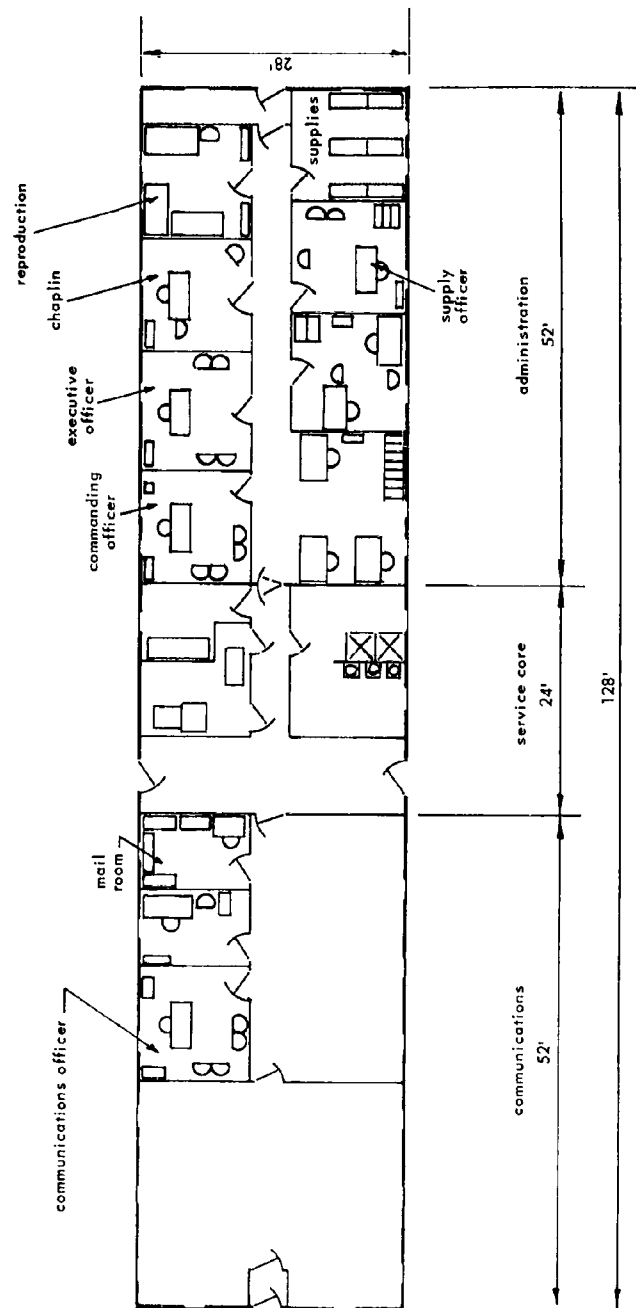


Figure 11. Building No. 8, administration — communications floorplan.

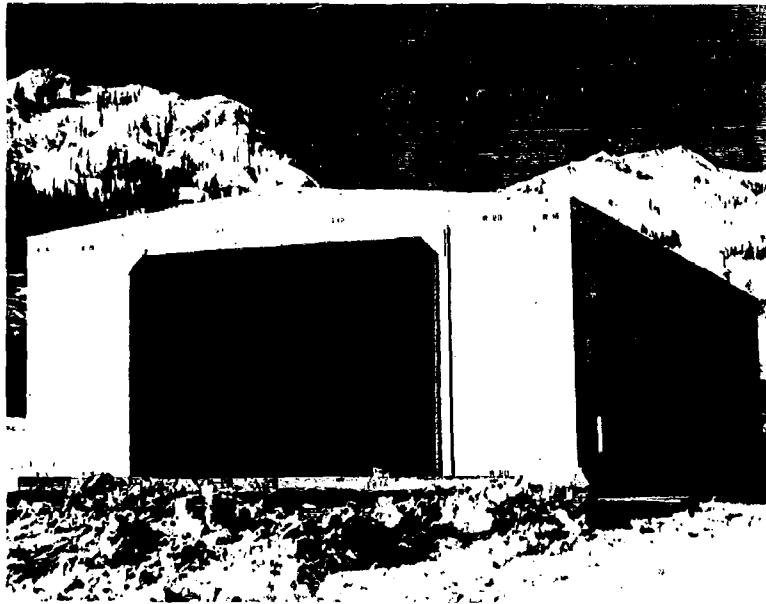


Figure 12. T-5M maintenance shelter.

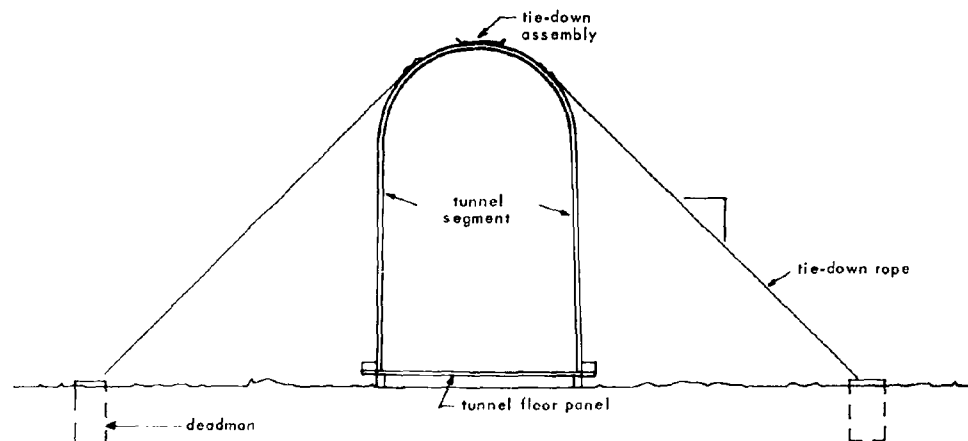


Figure 13. Cross section of connecting tunnel.

## PART III. CAMP LAYOUT

### LAYOUT

A number of basic approaches to the arrangement of buildings for the camp were considered.

#### Company Street Plan

This plan employs one or two streets through the camp, with buildings along each side of the streets. A compact camp can be achieved and oriented to minimize drifting of snow, but excessive lengths of tunnels are required to connect the buildings and the tunnels limit access to the buildings.

#### Central Core Plan

The utilities building is placed at the center of the camp in this plan and all other facilities are grouped around it in a circular pattern. This results in a compact camp with a minimum of utility distribution lines and interconnecting tunnels. The main disadvantage of this plan is difficulty in arranging the buildings for easy accessibility and freedom from drift.

#### In-Line Plan

This plan with buildings placed end to end is relatively free from drift and all buildings are easily accessible. Buildings could be connected by tunnels and the passageways through the length of the buildings would be used for camp traffic circulation. This layout is impractical because of the excessive length of the camp and the disturbance to occupants caused by traffic through the buildings.

#### Parallel Plan

In this arrangement buildings are placed side by side. Service cores could be connected by passageways and the passageway across the service core would be used for camp traffic circulation. The camp could be oriented to keep the ends of all buildings free from drift and easily accessible.

The parallel arrangement (Figure 14) was selected as the most practical layout for the temporary polar camp. It was chosen for the following reasons:

1. It is compact with a minimum length of tunnels and utility lines.
2. The ends of all buildings are easily accessible and relatively free from drift.
3. All traffic through buildings is confined to the service core and therefore not disturbing to occupants.
4. No intersecting tunnels are required.

The 50-man camp requires six buildings which can be placed side by side in a parallel layout 408 feet long. In the 100-man camp, which requires eight buildings, the parallel layout is still feasible although its total length of 560 feet approaches the practical limit. For the 150- and 200-man camps, additional buildings are placed in another parallel layout adjacent to the initial development. The two layouts are connected by one tunnel.

The major consideration given to placement of buildings within the camp was grouping areas of usage. The utilities facility was placed near the center of the camp for economical distribution of water and power. The mess hall and galley complex was also placed near the center of the camp for the convenience of all personnel and because it is a prime user of water and electrical power. The storage buildings are also near the center of the camp, which provides convenient access for supplies. The sick bay should be kept secluded and quiet, so the dispensary facility is located at one end of the camp. Recreation facilities are located as convenient as possible to all quarters buildings.

## ORIENTATION

The parallel layout of the camp should be oriented with the major axis parallel to the prevailing storm winds (Figure 15). This will keep the ends of the buildings swept free of snow. Snow will drift in between the buildings, but this will not present any serious problems as the ends will be accessible. The camp buildings should be located a minimum of 1/4 mile downwind from the end of the aircraft runway and 1/4 mile from the centerline of the runway.

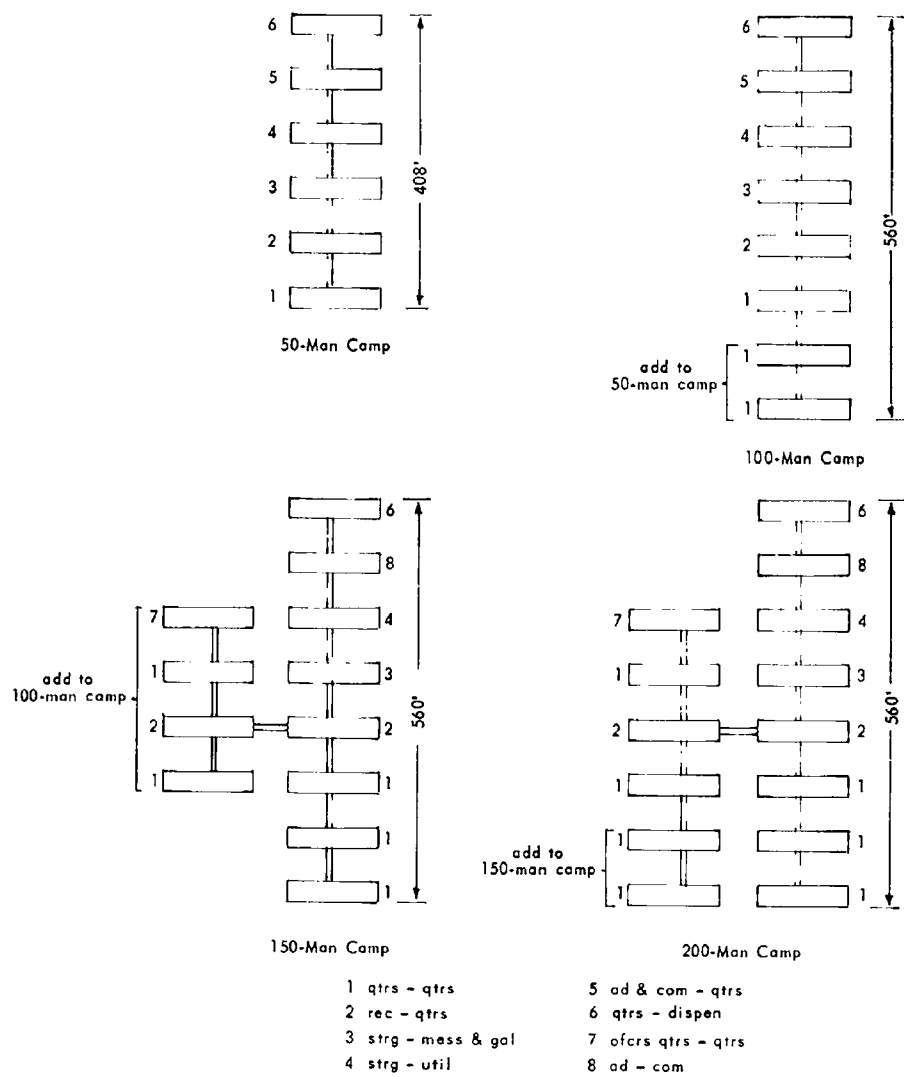


Figure 14. Camp layout.

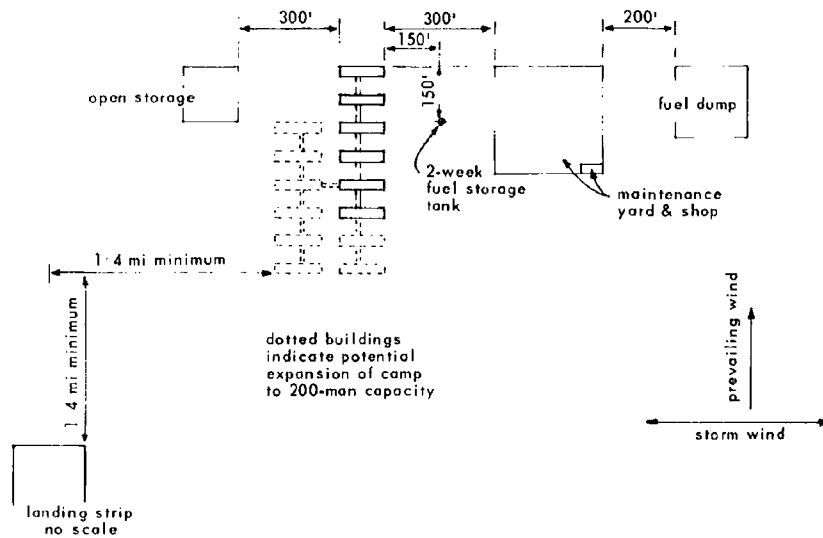


Figure 15. Camp vicinity plan.

## TRAFFIC CIRCULATION

Using the parallel layout and interconnecting tunnels between service cores, there will be heavy traffic through the service core doors. In order to facilitate traffic flow and provide adequate entry for large articles of furniture or equipment, 3-foot-wide doors are used in place of the standard 2-foot 8-inch doors and an 8-foot-wide passageway is provided across the service core. Selection of the passageway width and door size is discussed in Appendix D.

## PART IV. UTILITIES

### WATER SUPPLY AND WASTE DISPOSAL

Water supply and disposal of liquid waste are among the most difficult problems in the habitation of cold-weather regions. The conventional distribution and disposal systems cannot be used in the extreme temperatures prevalent in the Arctic and Antarctic. All supply and waste lines outside of buildings must be heated. The expense of installation and operation of such a system is justified in a camp with a life of 2 years or more by the conservation of manpower achieved.

#### Water Production

The source of water in polar regions is usually by snow melting for inland camps and salt-water distillation for coastal and ice-island camps.<sup>5</sup> In special cases other sources such as fresh-water lakes may be available. No water production equipment is included in this camp as the location and, consequently, the most economical method of production are unknown. Sufficient space for a snow melter or a distillation unit is provided in the utilities building. A snow melter would require a snow chute from outside the building similar to the chute described in NCEL Technical Report R-241, "Pioneer Polar Structures — Accessories for the Jamesway Shelter."<sup>6</sup> If melted snow is the water source, waste heat from the generators should be considered as a heat source for melting the snow. In addition to production of water, appropriate filtration and disinfection for palatability and bacterial control must be provided.

#### Water Storage

A minimum storage capacity of 2500 gallons is required for the 50-man camp. Rectangular aluminum tanks with 1175 gallons capacity were designed for this purpose. Four tanks with a total capacity of 4700 gallons are supplied with the 50- and 100-man camps. The capacity is doubled in the 150- and 200-man camps by supplying eight tanks. Based on a water usage rate of 10 gallons per day per man, about a 5-day supply is on hand at all times. This provides adequate storage for emergency use when weather or equipment breakdown prevents production of water. These tanks rest on wood platforms along one side of the utilities building.

## Water Distribution

Water is distributed from the storage tanks to the service cores of all buildings by a centrifugal pump with a variable-speed fluid drive. The pump is automatically energized on reduction of pressure caused by an increased demand. The water is pumped through heated distribution lines in an insulated utility trough which is described below under a separate heading. Copper tubing is used throughout the distribution system. Special water lines to fixtures in the mess hall, dispensary, and recreation facility are placed in the attic.

## Waste Disposal

All plumbing-fixture waste lines, including the toilet tanks, are connected to a main sewer line which runs the length of the camp inside the utility trough. The sewer is designed as a gravity system; therefore, provision for sloping the sewer must be made at the site. The camp design does not include a disposal plant, as the most economical method of disposal varies with site conditions. The sewer lines terminate 20 feet beyond the end building, and connecting lines must be provided to the disposal plant, pit, or whatever device is used. Disposal may be at one end of the camp or the sewer may slope both directions from the center depending on site conditions and method of disposal.

## PLUMBING AND CLEANING FIXTURES AND EQUIPMENT

### Service Core Utilities

Water Heaters. A 50-gallon water heater is supplied in the furnace room of each service core. These heaters have oil burners adapted to burn arctic-grade fuel oil. They have 120 gallons per hour recovery from 40 F to 140 F.

Toilets. A recirculating flush toilet unit was designed for the camp in an effort to conserve water. A unit with two toilet bowls and one urinal is used in each service core. It is a self-contained, electrically powered flush unit utilizing a chemical-water mixture as the basic flush liquid. The flushing system consists of an electric motor, pump, timer, and rotating-disk filter. All of the equipment is covered with a stainless-steel shroud. The tank is connected to the water and sewer lines for tank flushing and charging, and a 4-inch-diameter vent pipe is provided. A powder or crystalline chemical is used to control the odor and color of the flushing liquid by inhibiting the growth of bacteria. Draining and recharging is expected to be required about every 2 weeks. About 25 gallons is required for cleaning and about 10 gallons is required for recharging. It is expected that regular flush toilets



for a 50-man camp would require about 400 gallons per day. The recirculating toilets should require only about 10 gallons per day. This conservation of water should offset the initial purchase cost of the toilet units.

Lavatories. Three stainless-steel lavatories are provided in each service core. Push-button, slow self-closing faucets are used to conserve water. A shelf is mounted on the partition above the lavatories for the convenience of personnel.

Showers. Two showers are provided in each service core. Shower cabinets are mounted on a wood platform to provide space for drainage pipes under the showers. Two steps are required from the floor level to the showers.

Service Sink. A stainless-steel service sink with a chromium-plated spout threaded for a hose connection is located adjacent to the showers for hand laundry and for cleaning mops. A drinking fountain with a stainless-steel bowl is mounted on the back of the sink.

Laundry. Laundry equipment is included in the bath area. One automatic washer and one dryer with a capacity of 9 to 10 pounds of dry clothes are provided in each service core. The washing machine is the commercial type used in self-service laundries. The dryer is electric and requires 5500 watts. A table is provided between the washer and dryer for folding clothes.

#### Galley, Dispensary, and Darkroom Utilities

Galley Fixtures. The galley has a divided stainless-steel sink with one swing spout and two combination overflow and lever-operated drains. This sink will not be used for washing dishes, as a dishwasher is supplied. A waste pump is required for pumping the waste water from the dishwasher to the sewer line in the service core.

Dispensary Fixtures. The laboratory and pharmacy each require a table-type sink. The sink and the table top are stainless steel. They are supported on legs and provided with a lower shelf.

The bathroom has one stainless-steel lavatory of the same type used in the service cores. A single recirculating flush toilet similar to the larger unit used in the service cores is provided in the bathroom. The bathtub is stainless steel mounted on legs. A pump is required for emptying the tub as it cannot be elevated for gravity flow to the drain line.

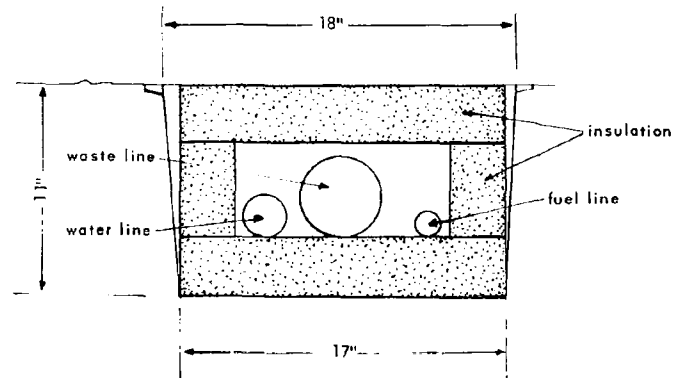


Figure 16. Cross section of the utility trough.

Darkroom Sink. The darkroom sink is stainless steel with a swing spout threaded for a hose connection. The darkroom is located adjacent to the service core so the sink can drain directly to the sewer line without the use of a pump.

#### UTILITY TROUGH

An insulated rectangular sheet-metal trough (Figure 16) protects the water, sewer, and fuel lines. The trough rests directly on the surface of the ground and runs under the service core of each building. It is lined with 3 inches of rigid insulation and has a removable top for easy access to the lines at any point. Water and sewer lines are heated with thermostatically controlled electric strip heaters wrapped around the pipes. The fuel line should not require any heat.

#### FUEL DISTRIBUTION

The fuel-distribution system consists of a 2-week main supply tank for the entire camp, 4-day supply tanks at each building, a distribution pump located in the utility building, and fuel lines. The main supply tank has a capacity of 21,000 gallons. The day tank at the utility building has a 2000-gallon capacity, and all other day tanks have a 400-gallon capacity. The fuel is pumped from the main supply tank to the utility building, and from there is distributed to the other buildings through lines in the utility trough.

A line from the generator coolant system is provided to the main supply tank and return, for heating the fuel so that it will flow freely. The coolant line flows to a heat exchanger which is inserted into the tank near the fuel outlet.

## ELECTRICAL SYSTEM

Electricity is required in polar regions for the operation of lights, power tools, communication equipment, and certain galley and other appliances. In the temporary polar camp, electricity is also required for heating water and sewer lines. The complete electrical system includes power production, camp distribution, and wiring within the buildings.

### Power Plant

The electrical requirement for the 50- and 100-man camps is about 200 kw. With 50 percent standby power, 300 kw is required. This is supplied by three 100-kw diesel-electric generators. Two operate continuously, with the third one used as standby power. One additional 100-kw generator is added in the 150- and 200-man camps. This results in three 100-kw generators operating continuously and one 100-kw generator serving as standby. Additional standby is provided by the 10-kw generators located inside the furnace room in the service core of each building. Instead of providing emergency heaters for use when the main power plant fails or camp distribution lines are out, the 10-kw generators were provided to operate the forced-air furnaces and also furnish emergency lighting.

All generators are three-phase, four-wire, grounded-wye sets providing 120 and 208 volts. They operate at 1200 rpm with a power factor of 0.8. All components of the 100-kw units are designed to permit parallel operation of up to four generators on a common switchboard bus.

### Camp Distribution

The distribution to all camp buildings is by four aluminum cables. They are supported on aerial cable racks which are mounted on top of the building at each side above the service core. The racks are constructed of steel angles, and bolted through the roof panels to the trusses. No poles are necessary between the buildings.

### Distribution in Buildings

Two 100-ampere panels are provided in the furnace room of each service core. One panel provides distribution to all passageways, lounges, and the furnace. The 10-kw emergency generator is wired to supply power to only this panel when a major

power failure occurs. The other panel distributes power to all other lights and outlets including the washer, dryer, toilet pump, water heater, and strip heaters for the water and waste lines. Wiring for all ceiling lights is in the attic; three or four conductors are encased in a common insulator. Conductors along the wall where insulation might be cut or chafed are protected by a surface raceway. The conductors and the raceway are fitted and cut to length in the field. The outlets and consequently the raceway are located 3 feet above the floor for easy access regardless of furniture placement.

Incandescent lights are used in the bedrooms, storage areas, passageways, and service cores. Fluorescent lights are used in all lounges and offices and in the recreation and mess hall and galley facilities. Lights are provided outside the buildings above each exterior door; these are the only lights provided in the tunnels.

## HEATING AND VENTILATING

All buildings in the camp are the same size, which permits the use of similar heating systems in each building with variation only in the location of supply registers to conform to the building layout. The entire system consists of a forced-air furnace, overhead supply and return air ducts, a fresh-air intake duct, and a humidifier. Controlled climatic tests of the system installed in a Modified T-5 are described in Reference 7.

### Furnace

The forced-air furnace has a capacity of 280,000 Btu per hour output and a fan capacity of 4000 to 4400 cubic feet per minute at 3/4-inch water external static pressure. Arctic-grade diesel fuel is used to operate the furnace. The fan is wired for continuous operation. Thermostats are located in the return air intake and in the supply air duct. The burner is energized on temperature drop of the return air or when supply air temperatures are lower than 70 F. The burner is de-energized on temperature rise of the return air or when the supply air temperature is higher than 140 F. The fresh-air intake is an 18-inch-diameter duct providing a maximum intake capability of 1000 cubic feet per minute.

### Ducts

Supply ducts are suspended from the trusses at the longitudinal center of the buildings. They are preformed of 1-inch-thick fiberglass with a fire retardant and vapor-barrier jacket on the surface. The duct sections are supplied flat for shipping. The duct is assembled with staples and 2-inch pressure-sensitive tape which is sealed with a heat iron. In buildings with individual rooms, short sheet-metal ducts are used between the main air-supply duct and the rooms.

Return air registers are provided above the doors to the service core. Ducts in the attic carry the return air to the furnace. In buildings with individual rooms, louvers are provided in the door to admit return air to the passageway which serves as a large duct to the return air register at the service core.

#### Humidifier

A humidifier is a vital part of heating systems in polar regions, which have extremely dry climates. The humidifier chosen for this camp is a centrifugal atomizer type designed to provide 24 pounds of water vapor per hour. It is located in the supply duct adjacent to the furnace. The water reservoir is equipped with a float which regulates the flow from the water supply line.

#### Supply Registers

Supply air registers are provided at 8- or 12-foot spacing in the side of the main duct or above the door to individual rooms. Two sets of airfoil louvers are provided. Horizontal and vertical louvers permit adjustment of deflection in both directions. Opposed-blade volume-control dampers are also adjustable by use of a permanently fixed key.

#### Galley Ventilation

Two range hoods with exhaust fans are required over the cooking area in the galley. Each fan exhausts 1600 cubic feet per minute. When both exhaust fans are in operation the fresh-air intake on one furnace is not sufficient to supply make-up air, and an extra furnace had to be added in the storage area for this purpose. It does not operate continuously, but only when the exhaust fans are in operation.

#### Utility Room Ventilation

The forced-air furnace in the utility room is used only to heat the building while it is being outfitted. When the generators are in operation they produce waste heat which is more than sufficient to heat the building. A louvered penthouse is provided on the roof above each generator for air intake. The generator exhaust is piped to the outside.

Consideration was given to using the generator waste heat to heat some of the other buildings. This was not feasible because of the distance between buildings and the complexity of piping the heat. If snow melting is used to produce water in this camp, the waste heat from the generators should be considered as a heat source for the snow melter.

## SAFETY SYSTEMS

Safety systems in polar regions are particularly important because of the remote location and the extreme weather conditions. Polar camps are often located in areas which are totally inaccessible during certain seasons of the year for periods as long as 9 months. In case of disaster in such a location, no outside assistance can be solicited and injured personnel cannot be evacuated. The extreme weather conditions add to the hazard because loss of shelter or heat would be fatal. Fire alarms, fire-fighting equipment, and intercommunications for the camp are mandatory.

### Automatic Fire Alarms

There are three basic types of automatic fire-detection systems:<sup>8</sup>

1. Fixed-temperature devices which operate a thermostat at a predetermined temperature or heat level
2. Rate-of-rise devices which operate when the temperature rise exceeds a predetermined rate
3. Smoke-detecting devices which sense the products of combustion

The fixed-temperature device was selected for its reliability and simplicity of operation. This device is available in both spot and line types. The spot type is better suited for the temporary polar camp because most of the buildings are partitioned into separate rooms. A detecting device should be placed in each room, and at several locations in large areas such as the recreation room and the mess hall.

The detectors should be connected to an alarm in the administration or communications area where someone is on duty at all times. In addition, the system should sound an alarm in the building where the fire occurs to warn all personnel to evacuate the building.

### Fire-Fighting Equipment

Most of the buildings in the camp are provided with four dry-chemical fire extinguishers. They are located in the furnace room, in the service core passageway, and at each end of the building. The furnace room is also provided with a CO<sub>2</sub> extinguisher for oil fires. The utility room is provided with two CO<sub>2</sub> extinguishers because of the four oil-burning generators. The galley is provided with extra dry-chemical fire extinguishers due to the added danger presented by the cooking done in this area. Additional fire-fighting equipment is supplied by a hose bibb and 75-foot hose in each service core.

### Intercommunications

Communications between buildings within the camp are essential for convenience in operation of the camp as well as for safety. A disaster can sometimes be averted by fast communications to give warning or to solicit all available assistance. This system should provide both for communications between two points and for general camp announcements.

A dial telephone system with an automatic switchboard would be worth the initial cost in the operator time it would save. It would eliminate the requirement of a man working as switchboard operator or controlling a master in a conventional intercom system. An automatic switchboard can be procured for 20- or 40-line systems. A paging adapter is available for the system. With this adapter, announcements can be made from any telephone over a public address system. Such a system would require installation of a speaker in each building and possibly in outside areas if camp operations require it.

## PART V. CONSTRUCTION

Construction in polar regions is particularly difficult and time consuming due to the extreme weather conditions and the resulting bulky clothing and frequent stops for warming periods. Experience has shown that construction is usually possible at temperatures down to -43 F and winds up to 25 mph.<sup>9</sup> High winds are usually more detrimental than extremely low temperatures.

### CONSTRUCTION SCHEDULE

Comfortable quarters and adequate messing facilities must be provided for the construction crew soon after their arrival at the site and throughout the construction effort. This requirement can be satisfied by using all or certain components of the 25-man pioneer polar camp.<sup>1</sup> The initial effort of the crew should be toward constructing these facilities.

The buildings for the temporary camp can be erected in any order, as the construction crew is not dependent on the facilities provided by the camp. After a building is erected, the furnace should be installed and put into operation to provide a heated building for installation of the remainder of the outfitting. Outfitting should proceed in the following order: partitions, wiring, ceiling, plumbing, and furniture. Since initial construction is normally done during the warm season, connecting tunnels between buildings need not be built until erection and outfitting of all buildings is completed.

### CONSTRUCTION CREW

The initial construction crew should be small because of the difficulty of providing adequate shelter as well as food, water, and sanitary facilities. After the construction camp is completed, the crew may be increased to the camp capacity. When the first building is erected and heated, a crew of electricians should be brought to the site to install the electrical systems while the construction crew proceeds with erection of the next building. Another crew should then be brought to the site to assemble the utility trough and water-distribution and sewer lines. These crews should continue construction and outfitting simultaneously.



The construction crew should be thoroughly trained in erection procedures before shipment of the camp to the construction site. This should particularly include practice in erecting the basic Modified T-5 building with foundation and partitions. The construction crew should include some men with experience in polar construction.

#### SITE PREPARATION

The site for each building must be fairly smooth and level. In snow camps this is easily accomplished. Camps on ice or permafrost may require some type of shoring to level the buildings if they are erected on pads. In some cases piles may be required to support the buildings.

#### CONSTRUCTION AIDS

The foundations, floor panels, and wall panels can be easily handled by two men. The trusses weighing 238 pounds each and the roof panels weighing 210 pounds each require weight-lifting equipment as they must be lifted 10 feet above the floor level. Scaffolding is required for securing adjacent roof panels to each other and tying them down to the trusses. The scaffolding would also be useful for installing the ceiling and the overhead wiring.

Cargo and personnel transportation can be provided by a track-mounted personnel carrier. A Size 4 tractor (Traxcavator) with attachments<sup>10</sup> would provide winching, hoisting, and weight-lifting capabilities. A utility service sled<sup>11</sup> with a 400,00-Btu/hr hot-air heater and a 8.75-kw electric generator would provide essential power and heat during construction of the camp.

The allowance list of construction supplies, Appendix B, includes nails, screws, fittings, and other miscellaneous items that might be useful for field fabrication. Packaged components should include all required items. The miscellaneous construction supplies may replace lost or damaged items or be used in conjunction with packing-crate material to field-fabricate useful accessories which are not included in the camp design.

## PART VI. SUMMARY

The polar camp developed provides all essential services for personnel living in polar regions. Some modifications or additions may be required to meet specific site conditions or operational requirements for a specific mission. The capacity may be doubled by using double bunks. This high-density occupancy is not desirable, but would not be critical for short periods of time.

The duplex arrangement provides a relatively independent basic building which permits easy expansion of the camp. The service cores of adjacent buildings are easily joined by connecting tunnels.

The estimated weight of the packaged camp is approximately 730,000 pounds. The estimated cost of the entire camp without the communications equipment listed in Appendix C is approximately \$570,000.

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## Appendix A

### DESIGN CRITERIA

#### GENERAL REQUIREMENTS

The purpose of the design is to provide a basic 50-man temporary-type polar camp component which is easily expandable in 50-man increments to 200-man capacity. The camp shall be suitable for surface installation on all types of polar terrain including snow, ice, and permafrost. It shall include all the elements necessary to provide adequate comfort and convenience for efficient and effective performance of personnel in a polar environment.

The design and the selection of all material, equipment, and components shall satisfy the following general requirements:

1. Satisfactory operation in ambient temperatures to -65 F
2. A minimum life expectancy of 5 years
3. Minimal maintenance compatible with a 5-year life
4. Air shipment by C-130 or other aircraft
5. Maximum use of Federal standard stock items and readily available commercial items
6. Simplicity of design
7. Fast and efficient erection or assembly
8. Integrated expansion for 50- to 200-man size

#### CAMP LAYOUT

The camp layout shall be adaptable to local site conditions as follows:

1. The layout shall be oriented to minimize drifting of snow by prevailing winds.
2. A minimum of 48 feet shall be maintained between structures.

3. The layout shall be designed to easily accommodate the interconnection of buildings.
4. The layout shall permit the centralizing of all stationary fuel-consuming equipment, with the possible exception of building heating systems.
5. Areas of usage shall be grouped where possible.

#### FACILITIES

The facilities to be provided in the basic 50-man camp include:

1. Quarters
2. Galley and mess hall
3. Head and laundry
4. Medical facilities
5. Administration facilities
6. Communications facilities
7. Camp maintenance shop
8. Covered storage
9. Open storage area
10. Uncontaminated snow area (when water supply is dependent on melting snow only)
11. Water production and distribution
12. Sewage collection and disposal
13. Power generation and distribution
14. Fuel receiving, storage, and distribution

## STRUCTURES

1. The primary building units for the camp shall be the Army prefabricated, panelized, wood, arctic building, Models T-5, Modified T-5, and T-5M.
2. Any buildings or structures required in addition to the above shall be of lightweight, knockdown construction.
3. Suitable foundations shall be provided for all structures for erection on frozen ground, sea ice, and deep snow.
4. All roof lines of structures in a single complex or in close proximity to each other shall be maintained at the same elevation.
5. Suitable tie-down systems shall be provided for all possible types of locations.
6. Design loads for additional structures shall be 50-psf snow load and 100-mph wind load.

## SPACE ALLOWANCES

To provide an adequate comfort level for the occupants, the space-allowance factors deviate from those required for standard installations in temperate locations. In considering the design life, the geographical location, and the type of buildings, the factors to be used in this design are subdivided into two categories: (1) Specific space allowances for buildings in which the floor space is directly proportional to the rated camp capacity for the normal level of occupancy. (2) General space allowances for buildings in which the floor space for certain facilities will be determined by the camp design.

1. Specific Space Allowances:
  - a. The net sleeping area shall occupy not less than 57 percent of the quarters floor area and shall be subdivided into individual rooms of not less than 90 square feet each.
  - b. The net lounge area in each quarters building shall not be less than 20 square feet per man.

- c. The space for hanging wet outer garments in each occupied building shall be not less than 1 square foot per man.
- d. The messing area, including tables, chairs, cloakroom, and coffee urn, shall be not less than 10 square feet per man.
- e. The galley shall have a square-footage area capable of preparing food for twice the normal rated capacity of the messing area.

2. General Space Allowances:

- a. The administration area shall provide adequate space for clerical and administrative activities, communications operations, and camp postal facilities.
- b. The utility area shall provide space for power generation and water production and storage. It shall be of adequate size for easy operation and maintenance of the equipment.
- c. The general recreation area shall provide space for standard recreation equipment, ship's store, photographic laboratory, library, and group activities such as movies and religious services.
- d. The medical facility shall provide adequate space to conform to the requirements established by the Bureau of Medicine and Surgery for a 100-man camp. This facility shall be suitable for easy expansion to the requirements for a 200-man camp.
- e. The head and laundry areas shall provide adequate space to accommodate the fixtures specified in the Sanitation and Hygiene section of these criteria.
- f. The camp shop structure shall be adequate for maintaining and repairing the camp facilities and vehicles. Shop facilities for camp construction and the repair of construction equipment will not be provided in the camp design.
- g. Adequate fuel storage facilities shall be provided to operate the camp for a 12-month period without resupply.
- h. When a sewage-disposal system is provided, it will be housed in a separate building of adequate size for easy operation and maintenance.

## OUTFITTING

The design or selection of outfitting for the camp shall satisfy the following requirements:

1. A maximum use of fire-resistant materials
2. A maximum use of modular design
3. A maximum use of knockdown, lightweight furniture and fixtures
4. A maximum standardization of equipment, components, and accessories
5. Single bunks easily converted into double bunks
6. Either electric- or diesel-fired galley equipment

## Water Supply

The water supply system shall provide for production and distribution of water within the camp as follows:

1. Fresh-water production shall provide for a minimum of 1000 gallons per day, based on:
  - a. Sea water, brackish water, or snow field sources
  - b. Filtration and disinfection for palatability and bacterial control
  - c. Water-storage capacity of 2500 gallons minimum
  - d. Double occupancy of the 50-man component
  - e. Water usage of 10 gallons per man per day
2. Fresh-water distribution shall provide for:
  - a. Hot and cold water service to the galley, heads and laundries
  - b. Adequately cooled and palatable drinking water
3. Where feasible, a salt-water system shall be provided for sanitation and fire fighting.



### Sanitation and Hygiene

The following sanitation requirements are based on single-room occupancy, with no additional fixtures required when the occupancy is doubled:

1. One shower for each nine men
2. One lavatory for each six men
3. One commode for each nine men
4. One urinal for each eighteen men
5. One automatic washing machine and one dryer for each eighteen men

### Power Generation and Distribution

1. Electrical power will be provided by diesel-electric sets.
2. Standby power shall be not less than 50 percent of the normal load.
3. Four-wire conductors shall be used throughout the distribution system.
4. A standby generator for communications equipment shall be provided near the communications area.

### Air Conditioning, Heating, and Ventilating

1. The air-conditioning system shall be capable of providing sufficient heat to maintain a room temperature of 70 F at 30 inches above the floor at an outside air temperature of -65 F with no wind.
2. The system shall be equipped to provide a relative humidity of not less than 30 percent.
3. The system shall be capable of providing not less than 2-1/2 air changes per hour of fresh air and 7-1/2 air changes per hour of recirculated air, and shall be designed for a minimum of stratification within practical limits for each building.
4. The system shall be capable of providing adequate survival heat without the use of electrical power from the main power plant.

### Safety Systems

Provision shall be made for:

1. Automatic fire alarms
2. Intercommunication between primary buildings
3. Adequate fire fighting throughout the camp

### Construction Aids

The minimum construction aids necessary for rapid and efficient construction of the camp will be determined during design. This equipment, which also will be suitable for operation of the camp, shall provide for:

1. Cargo transportation
2. Personnel transportation
3. Winching, hoisting, and weight-lifting
4. Portable power and portable heating

## Appendix B

### CAMP OUTFITTING AND ALLOWANCE LISTS

The following lists tabulate all components in the camp with their weights, cubes, and costs. An outfitting list is provided for each building. Allowance lists are provided where applicable. The outfitting list includes all items which appear in the bill of material on the general-arrangement drawings.<sup>2</sup> Allowance lists of essential items not shown on the drawings follow the appropriate outfitting list. In addition to the outfitting for each building, a list of erection aids are included for construction of the camp.

The values presented in the lists are estimates based on available information, and should be used for general planning purposes only.

SERVICE CORE  
Outfitting

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
1	Partition Panel P-1	8	704	48.0	800.00
2	Partition Panel P-2	11	968	66.0	1,100.00
3	Partition Panel P-3	7	616	42.0	700.00
4	Partition Panel P-4	2	176	12.0	200.00
5	Partition Panel P-6	1	113	6.0	110.00
6	Partition Panel P-7R	1	113	6.0	110.00
7	Partition Panel P-8	1	113	6.0	110.00
8	Partition Panel P-11	2	226	12.0	220.00
9	Partition Panel P-12	1	113	6.0	110.00
10	Shower platform assembly, three sheets of 3/4" plywood 4 x 8', twelve 2 x 4 x 8'; 2 lb 16d nails, 2 lb 8d nails	1	300	16.0	32.00
11	Coat hanger, 1 x 4 x 8', eight 3" wire coat hooks, Type F1173	1	2	0.2	0.50
12	Shelf, 3/4" plywood 8" x 6', three 6 x 8 shelf brackets	1	10	2.0	2.00

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
13	Mirrors, 18 x 30", metal frame	3	27	1.0	19.47
14	Toilet unit step, 3/4" plywood 1'6" x 3'6", 2 x 8 x 10'; two dozen #8 x 1-1/2" F.H.W.S., one dozen #12 x 4" F.H.W.S.	1	30	15.0	3.00
15	Heating system, 350,000-Btu oil-fired furnace w/humidifier and thermostats, supply duct and return-air plenum	1	1,100	90.0	1,300.00
16	Emergency generator, 10-kw, 3-phase, 4-wire, grounded wye, 120/208-v, 60-cycle, 18-rpm	1	1,430	24.0	2,545.00
17	Electrical, panelboards, wiring, outlets, lighting fixtures	1	200	25.0	500.00
18	Fire extinguisher, dry chemical, hand type, 9Y-4210-679-2663	2	100	4.0	150.00
19	Fire extinguisher, CO <sub>2</sub> , hand type, 9C-4210-808-4545	1	50	2.0	75.00
20	Plumbing, supply and waste lines inside building	1	500	130.0	700.00
21	Water heater, 50-gal, oil-fired, 120-gph recovery from 40 F to 140 F	1	204	25.0	150.00
22	Toilet unit, recirculating flush type, 2 toilet bowls, 1 urinal	1	250	32.0	2,200.00

Item No.	Description	Quantity	Weight	Cube (ft <sup>3</sup> )	Cost (\$)
23	Washing machine, automatic, front-load, tilted tumbler, 2-speed transmission, 1/3-hp, 1725-rpm, 120-v, 60-cycle	1	260	30.0	250.00
24	Dryer, electric, 1/4-hp, 5500-watt, 120/230-v, 60-cycle, 9-10 pounds dry clothes, adjustable timings of 10, 20, 30, 40, 50 or 60-minute increments	1	170	30.0	160.00
25	Lavatory	3	51	2.0	285.00
26	Service sink	1	16	4.0	60.75
	TOTAL		<u>7,842</u>	<u>636.2</u>	<u>11,892.72</u>

ENLISTED QUARTERS UNIT  
Outfitting

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
1	Partition Panel P-1	12	1,056	72.0	1,200.00
2	Partition Panel P-2	21	1,848	126.0	2,100.00
3	Partition Panel P-3	11	968	66.0	1,100.00
4	Partition Panel P-7R	2	226	12.0	220.00
5	Partition Panel P-7L	9	1,017	54.0	990.00
6	Partition Panel P-9	1	113	6.0	110.00
7	Coat hanger, 1 x 4 x 12', thirteen 3" wire coat hooks Type F1173	1	3	0.3	0.75
8	Heating duct	1	80	50.0	160.00
9	Drop ceiling in hallway and lounge	1	80	10.0	100.00
10	Electrical system and fixtures	1	225	26.0	500.00
11	Bed, shore, steel-gray, 36" W x 79" L, GF 7105-269-5292	11	1,475	137.5	284.90
12	Wardrobe, metal, gray, double-door, 84" H x 36" W x 24" D, 7105-269-9217, Size 2	11	2,552	99.0	862.40
13	Chair, straight w/arms, upholstered, 7110-273-8782	13	260	130.0	260.00

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
14	Chair, folding, upholstered, 7105-205-1050	11	231	27.5	88.00
15	Table, metal-top, linoleum-covered, one drawer, 36" L x 24" W x 30-1/2" H, 7110-264-5227	11	330	66.0	220.00
16	Chair, w/arms, removable cushion, 7105-141-5385	2	54	24.0	140.00
17	Davenport, tubular aluminum, removable cushions, 7105-705-4100	1	110	30.0	150.00
18	Table, occasional, formica top, w/shelf, 30" L x 18" W x 22" H, 7105-270-6107	2	54	12.0	40.00
19	Table, metal top, linoleum-covered, one drawer, 45" L x 34" W x 30-1/2" H, 7110-262-6665	1	40	12.0	25.00
20	Fire extinguisher, dry-chemical, hand type, 9C-4210-808-4545	1	50	2.0	75.00
TOTAL			10,772	962.3	8,626.05



ENLISTED QUARTERS UNIT  
Allowance List

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
1	Blackout curtains	15	22	2.0	15.00
2	Rug, cotton, 4 x 6'	2	18	1.0	15.94
3	Rug, cotton, 30 x 54"	11	55	5.0	41.47
4	Mattress, bed, innerspring, built-in berth type, 34-1/2 x 76 x 6-1/2", DT 7210-263-8580	11	946	160.6	426.80
5	Pillow, bed, chicken-feather, 17-1/2 x 21", DT 7210-160-0373	11	36	5.0	6.05
6	Sheet, bed, 72 x 102", DF 7210-171-1096	44	55	4.4	77.00
7	Pillowcase, preshrunk, 20-1/2 x 32-1/2", DT 7210-171-1100	22	11	2.2	11.00
8	Blanket, bed, gray, officer's, 66 x 86", DT 7210-171-1083	22	165	16.5	178.20
9	Bedsread, Type X, blue & white, 56 x 88", DT 7210-543-6910	11	36	3.3	34.10
10	Table lamp	13	104	26.0	136.50
	TOTAL		<u>1,448</u>	<u>226.0</u>	<u>942.06</u>

RECREATION  
Outfitting

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
1	Partition Panel P-1	4	352	24.0	400.00
2	Partition Panel P-2	2	176	12.0	200.00
3	Partition Panel P-3	3	264	18.0	300.00
4	Partition Panel P-4	1	88	6.0	100.00
5	Partition Panel P-5	2	226	12.0	220.00
6	Partition Panel P-6	2	226	12.0	220.00
7	Partition Panel P-7L	1	113	6.0	110.00
8	Partition Panel P-9	1	113	6.0	110.00
9	Heating duct	1	80	50.0	160.00
10	Drop ceiling at center of building	1	240	30.0	300.00
11	Electrical system and fixtures	1	225	26.0	500.00
12	Fire extinguisher, dry-chemical, hand type, 9Y-4210-679-2663	1	50	2.0	75.00
13	Table, folding legs, metal top, artificial leather covered, 30"L x 30"W x 27"H, 7105-269-9274	8	120	10.0	252.00
14	Chair, folding, upholstered, 7105-205-1050	54	1,134	81.0	432.00



Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
26	Coat hanger, 1 x 4 x 8', nine 3" wire coat hooks Type F1173	2	4	0.4	1.00
27	Panel, 3/4" plywood 3'3" x 3'4-1/4", w/four 4" surface bolts Type F1062	2	72	8.0	11.00
28	Shelf, 3/4" plywood 1'6" x 3'3", w/two 10 x 12" shelf brackets Type F1068	2	20	4.0	4.00
29	Sink, for darkroom	1	155	40.0	405.00
TOTAL			<u>5,706</u>	<u>724.4</u>	<u>5,865.04</u>



MESS HALL AND GALLEY  
Outfitting

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
1	Partition Panel P-1	8	704	48.0	800.00
2	Partition Panel P-2	12	1,056	72.0	1,200.00
3	Partition Panel P-3	8	704	48.0	800.00
4	Partition Panel P-4	4	352	24.0	400.00
5	Partition Panel P-5A	1	113	6.0	110.00
6	Partition Panel P-7L	1	113	6.0	110.00
7	Partition Panel P-8	2	226	12.0	220.00
8	Partition Panel P-9	2	226	12.0	220.00
9	Partition Panel P-10	2	226	12.0	220.00
10	Partition Panel P-12	1	113	6.0	110.00
11	Furnace, 350,000-Btu	1	1,035	80.0	1,042.00
12	Water heater, 50-gal	1	204	25.0	150.00
13	Generator, 10-kw	1	1,430	24.0	2,545.00
14	Fire extinguisher, dry-chemical, hand type, 9Y-4210-203-0217	5	250	10.0	375.00
15	Fire extinguisher, CO <sub>2</sub> , hand type, 9C-4210-203-0217	2	100	4.0	150.00

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
16	Heating duct	1	80	50.0	160.00
17	Drop ceiling at center of building	1	240	30.0	300.00
18	Electrical system and fixtures	1	225	26.0	500.00
19	Table, dining, w/bracket seats, Mil-T-18143D; 7105-559-1334	12	80	40.0	1,123.56
20	Shelving, metal, gray, adjustable, 7 shelves, 48"W x 12"D x 75"H, Class 2, 7125-559-6378	3	162	12.0	45.21
21	Tray slide unit, consisting of solid tray rail and mounting brackets with mounting screws	1	30	10.0	100.00
22	Panel, 3/4" plywood 1'6" x 8'	5	142	12.0	18.88
23	Shelf brackets, 10x12", Type F1068	20	20	1.0	5.90
24	Range hood #1	1	160	36.0	335.40
25	Range hood #2	1	160	36.0	335.40
26	Dish table #1	1	250	36.0	355.00
27	Dish table #2	1	250	30.0	355.00
28	Dish table #3	1	250	30.0	355.00
29	Dish table #4	1	250	30.0	355.00
30	Worktable, enclosed base	1	275	30.0	200.00
31	Baker's table, w./3 drawers	1	275	30.0	200.00

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
32	Ingredient bins, w/casters, 150-lb capacity	2	20	10.0	30.00
33	Cabinet, dough-proofing, 20 bun pans	1	225	27.0	380.00
34	Freezer, 40-cf, double-door, reach-in type	1	355	54.0	349.95
35	Refrigerator, 65-cf, 3-door, reach-in type	1	700	130.0	787.00
36	Food mixing machine, 30-qt, floor model	1	320	18.0	1,047.00
37	Oven, 3-section, electric, 27-kw, upper and lower heating units	1	697	26.0	836.00
38	Slicing machine, meat, table model, electric, 1/4 hp	1	30	10.0	190.00
39	Range, electric, 21.9-kw, 3 hotplates, one oven	1	570	20.0	347.00
40	Steamer, w/stand, electric, 9.65-kw, capacity three #200-size cafeteria pans	1	280	16.0	234.00
41	Griddle, w/stand, electric, 16.2-kw, 850-in <sup>2</sup> minimum grid surface	2	460	40.0	554.00
42	Fryer, w/stand, electric, 12-kw, 28 lb fat capacity	1	75	10.0	184.00
43	Table, hot-food, 4-section, dry type, electric, 660-watt per section	1	80	36.0	564.00
44	Cold-food storage and compressor, w/stand, compressor 1/3 hp, 6-watt condensing unit fan motor, 2 doors, 2 shelves	1	400	36.0	350.00





MESS HALL AND GALLEY  
Allowance List

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
1	Food preparation and service set, designed for expansion unit hospital, communication zone, 50-bed, 7360-543-6530:	1	300	100.0	341.00
	Bowl, eating	72			
	Coffee boiler	2			
	Cup, drinking	72			
	Dishpan	2			
	Dispenser, sugar	6			
	Food container, insulated	3			
	Food turner	2			
	Fork, table	72			
	Knife, cook's	3			
	Knife, table	72			
	Ladle, kitchen	2			
	Pan, baking and roasting	2			
	Pan, frying	2			
	Pan, steam-table, 2-3/4-qt cap	2			



Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
5	Brush, grease, cooking and baking, flat, hog-bristle, 1-1/8-oz min wt, 1/2" thick inside ferrule, 2-3/8" long outside ferrule, 5-3/8" long handle, Mil-B-1995, 7330-223-8006	4	2	0.2	2.52
6	Cleaver, meat, 8" blade, Fed GGG-C-746, Type I, 7330-559-4626	2	4	0.2	6.20
7	Colander, aluminum, 16-qt cap, 9-1/4" o/a ht, 15-7/16" ID top, Fed RR-A-466, Type V, 7330-272-3120	1	1	2.0	9.00
8	Cutter, butter, hand, frame type, 1-lb print cap, 60 pats per lb, Fed GGG-C-743, Size 60, 7330-272-9488	1	2	0.2	5.10
9	Cutter, doughnut, steel, 3" ID, 7330-633-8904	3	1	0.1	3.45
10	Cutter set, cookie, set of 3, one 2" rd, one 2-1/2" rd, one 3" rd, w/handles, Mil-C-17519, Type I, 7330-543-7097	1	1	0.1	0.70
11	Eggbeater, CRES blades, 11-5/8" to 13-1/2" o/a lgth, Mil-E-2030, 7330-243-3408	1	1	0.1	1.00
12	Grater, food, steel, 1 grating surface, Mil-G-17532 (SHIPS), Type A, 7330-285-9960	1	1	0.1	0.30

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
13	Measuring set, spoon, CRES, 4 spoons, 7330-272-7876	3	1	0.1	0.45
14	Opener, can, bench-mounted, Fed FF-O-601, Type III, Class B, 7330-249-9161	1	3	0.2	12.90
15	Opener, can, hand, Fed FF-O-601, Type I, mechanical, Class B, 7330-272-2591	5	1	0.1	3.10
16	Pan, baking and roasting, steel, 20-1/4" long, 12-1/4" wide, 4-3/4" deep, Mil-P-3852, Type I, Class 1 or 2, 7330-292-9413	4	16	4.0	5.60
17	Pan, baking sheet, aluminum, 25-1/8" long, 17-1/8" wide, 1" deep, Fed RR-A-466, Type XVI, Style 4, Size 2, 7330-633-8905	6	4	2.0	16.80
18	Pan, bread, strapped unit type, w/4 compartments, 14-1/2" o/a lgth, 21-1/8" o/a width, 3-1/2" o/a depth, Fed RR-P-58, Type II, Class C, Size 1, 7330-255-1531	4	6	6.0	10.40
19	Pan, pie, aluminum, 9" dia, 1-1/4" deep, Fed RR-A-466, Type XVIII, Size 2, 7330-823-6883	10	2	0.5	2.50
20	Peeler, potato, hand, steel, oxide finish, 6-1/6" o/a lgth, Mil-P-20583, 7330-238-8316	6	2	0.1	0.84

Item No.	Description	Quantity	Weight (lb)	Cube (ft. <sup>3</sup> )	Cost (\$)
21	Pot, cooking, CRES, round, w/cover, 7-1/2-qt cap, 9-5/8" dia, 6-7/8" deep, Mil-S-00170, 7330-256-9935	4	10	4.0	28.00
22	Rolling pin, wood, w/stationary handles, 3-3/4" dia of cylinder, 14-1/2" long excl handles, 22" to 24" o/a lgth, Fed LLL-R-530, Type I, Size 3, 7330-153-9749	2	4	0.4	6.00
23	Saucepan, CRES, round, w/cover, 2-qt cap, 5" o/a dia, 3" o/a depth, Mil-S-40044, Size 2, 7330-240-2134	4	6	0.6	24.80
24	Sifter, flour, hand, 100.8-in. <sup>3</sup> hopper cap, Fed RR-S-345, Type I, Class 1, 7330-184-0089	2	2	0.4	5.90
25	Knife, butcher's, carbon-steel blade, 9-3/4" min lgth clear of handle, Mil-K-21756 (10" blade), 7340-579-3303	6	6	0.2	8.10
26	Knife, paring, carbon-steel blade, 3-1/2" long clear of handle, rosewood handle, Fed GGG-C-746, Type V, 7340-223-7769	6	4	0.2	1.32
27	Pitcher, syrup, glass, colorless, 20-oz cap, Fed DD-T-101, Type I, Item 7, 7350-170-8335	12	36	24.0	11.88
28	Pitcher, water, CRES, 4-qt cap, Fed RR-P-386, Amend 2, 7350-223-7752	6	23	36.0	33.00

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
29	Can, ash and garbage, galvanized finish, w/strengthening corrugations, w/cover, suitable for nesting, 10-gal cap, 17-3/8" high, 14-13/16" dia top, 12-15/16" dia bottom, Fed RR-C-82a, 7240-160-0435	6	60	9.0	18.00
30	Clock, alarm, 6645-238-9080	2	4	2.0	4.00
31	Scale, beam, 16-lb, 6670-240-5832	1	36	18.5	5.00
32	Towel, dish, 7210-171-1144	30	1	2.5	4.00
33	Apron, cotton, 8415-255-8577	20	14	2.0	20.00
34	Gloves, cotton, 8415-268-8324	7 pr	4	1.0	10.00
	TOTAL		568	221.2	638.91

# HEATED STORAGE Outfitting

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
1	Partition Panel P-1	5	440	30.0	500.00
2	Partition Panel P-2	4	352	24.0	400.00
3	Partition Panel P-3	3	264	18.0	300.00
4	Partition Panel P-4	1	88	6.0	100.00
5	Partition Panel P-8	1	113	6.0	110.00
6	Partition Panel P-9	1	113	6.0	110.00
7	Partition Panel P-10	1	113	6.0	110.00
8	Heating Duct	1	80	50.0	160.00
9	Electrical system and fixtures	1	112	13.0	250.00
10	Furnace, 350,000-Btu	1	1,035	80.0	1,042.00
11	Fire extinguisher, dry chemical, hand type, 9Y-4210-679-2663	2	50	2.0	75.00
12	Shelving, metal, gray, adjustable, 7 shelves, 48"W x 24"D x 75"H, Class 2, 7125-559-6378	71	7,668	568.0	2,139.94
TOTAL		10,428	809.0		5,296.94



# UTILITIES Outfitting

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
1	Partition Panel P-1	4	352	24.0	400.00
2	Partition Panel P-2	2	176	12.0	200.00
3	Partition Panel P-3	2	176	12.0	200.00
4	Partition Panel P-8	2	113	6.0	110.00
5	Electrical system and fixtures	1	150	16.0	300.00
6	Plumbing, water lines and connections	1	200	40.0	400.00
7	Furnace, 350,000-Btu	1	1,035	80.0	1,042.00
8	Generator, diesel-engine, 100-kw, 3 $\phi$ , 4-wire, grounded-wye, 120/208-v, 60-cycle, 1200-rpm	3	12,045	288.0	19,095.00
9	Fuel-distribution pump, 10 gpm at 100 psi, 1-1/2-hp, 1200-rpm, 208-v, 3 $\phi$ , 60-cycle	1	91	5.0	114.50
10	Coolant pump, 18 gpm at 50 psi, 1-1/2-hp, 1200-rpm, 208-v, 3 $\phi$ , 60-cycle	1	91	5.0	114.50
11	Water-distribution pump, centrifugal pump, variable-speed fluid drive, constant pressure of 80 psi from zero gpm to 100 gpm	1	494	45.0	531.27
12	Water-storage tank, 5'10" x 10'6" x 2'3" high removable top, 1/8" aluminum const	4	1,000	160.0	1,600.00

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
13	Fire extinguisher, dry-chemical, hand type, 9Y-4210-679-2663	2	100	4.0	150.00
14	Fire extinguisher, CO <sub>2</sub> , hand type, 9C-4210-203-0217	2	100	4.0	150.00
15	Water-tank platform, 10 x 29 x 1'9" high, 2 x 4 framing, 3/4" plywood top	1	2,100	112.0	224.00
16	Switchboard and connections to generators		200	25.0	500.00
	TOTAL		<u>18,423</u>	<u>838.0</u>	<u>25,131.27</u>

UNHEATED STORAGE  
Outfitting

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
1	Partition Panel P-1	4	352	24.0	400.00
2	Partition Panel P-2	2	176	12.0	200.00
3	Partition Panel P-3	2	176	12.0	200.00
4	Partition Panel P-8	2	113	6.0	110.00
5	Fire extinguisher, dry-chemical, hand type, 9Y-4210-679-2663	2	100	4.0	150.00
6	Shelving, metal, gray, adjustable, 7 shelves, 48"W x 24"D x 75"H, Class 2, 7125-559-6378	80	8,640	640.0	2,411.20
7	Electrical system and fixtures	1	112	13.0	250.00
	TOTAL		<u>9,669</u>	<u>711.0</u>	<u>3,721.20</u>

ADMINISTRATION AND COMMUNICATIONS  
Outfitting

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
1	Partition Panel P-1	6	528	36.0	600.00
2	Partition Panel P-2	8	704	48.0	800.00
3	Partition Panel P-3	4	352	24.0	400.00
4	Partition Panel P-5	1	113	6.0	110.00
5	Partition Panel P-7R	1	113	6.0	110.00
6	Partition Panel P-7L	2	226	12.0	220.00
7	Partition Panel P-9	1	113	6.0	110.00
8	Partition Panel P-10	1	113	6.0	110.00
9	Heating duct	1	80	50.0	160.00
10	Drop ceiling at center of building	1	240	30.0	300.00
11	Electrical system and fixtures	1	225	26.0	500.00
12	Fire extinguisher, dry-chemical, hand type, 9C-4210-808-4545	2	100	4.0	150.00
13	Desk, flat-top, steel, gray, 60" L x 34" W x 30-1/2" H, 7110-270-9840	3	825	120.0	374.85
14	Chair, rotary, w/arms, upholstered, w/casters, 7110-273-8793	3	159	36.0	149.85

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
15	Desk, typist's, steel, gray, 60" L x 34" W x 30-1/2" H, 7110-270-9838	4	1,100	160.0	599.80
16	Chair, typist's, rotary, w/o arms, upholstered, w/casters, 7110-273-8798	4	112	40.0	79.80
17	Chair, folding, upholstered, 7105-205-1050	13	273	32.5	104.00
18	Bookcase, wood, 3 shelves, w/base, 26" W x 50" H x 11" D, 7110-273-9615	5	110	50.0	59.75
19	Filing cabinet, cap size, steel, 5 drawers, 57-1/2" H x 28" D x 18" W, 7110-292-4386	6	1,014	36.0	479.70
20	Shelving, metal, gray, adjustable, 7 shelves, 48" W x 18" D x 75" H, Class 2, 7125-559-6378	6	414	36.0	122.82
21	Safe, 4 handles, modified M1942, 15" W x 15" D x 24" H, 7110-248-9306	1	125	8.0	57.95
22	Table, metal top, linoleum-covered, one drawer, 36" L x 24" W x 30-1/2" H, 7110-264-5227	1	30	6.0	20.00
23	Table, metal top, linoleum-covered, 2 drawers, 72" L x 30" W x 30" H, 7110-285-2409	2	100	30.0	70.00
24	Shelf, 3/4" plywood 1'6" x 3'3", 2 Type F1068 10x12 shelf brackets	1	10	2.0	2.00
25	Window closure, 3/4" plywood 3'3" x 3'4-1/4", 4 Type F1062 4" surface bolts, w/screws	1	36	4.0	5.50
TOTAL			7,215	814.5	5,696.02

OFFICERS' QUARTERS (7 Rooms)  
Outfitting

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
1	Partition Panel P-1	8	704	48.0	800.00
2	Partition Panel P-2	18	1,584	108.0	1,800.00
3	Partition Panel P-3	7	616	42.0	700.00
4	Partition Panel P-4	2	176	12.0	200.00
5	Partition Panel P-7R	7	791	42.0	770.00
6	Partition Panel P-9	1	113	6.0	110.00
7	Coat hanger, 1 x 4 x 12', thirteen 3" wire coat hooks Type F1173	1	3	0.3	0.75
8	Heating duct	1	80	50.0	160.00
9	Drop ceiling in hallway and lounge	1	80	10.0	100.00
10	Electrical system and fixtures	1	225	26.0	500.00
11	Fire extinguisher, dry-chemical, hand type, 9Y-4210-679-2663	1	50	2.0	75.00
12	Bed, shore, steel, gray, 36"W x 79"L, GF 7105-269-5292	7	938	87.5	181.30
13	Wardrobe, metal, gray, double-door, 84"H x 36"W x 24"D, Size 2, 7105-269-9217	7	1,624	63.0	548.80



OFFICERS' QUARTERS (7 Rooms)  
Allowance List

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
1	Blackout curtains	14	21	2.0	14.00
2	Rug, cotton, 30 x 54"	7	35	3.5	64.09
3	Rug, cotton, 4 x 6'	2	18	1.0	15.94
4	Mattress, bed, innerspring, built-in berth type, 34-1/2 x 76 x 6-1/2", DT 7210-263-8580	7	602	108.5	271.60
5	Pillow, bed, chicken-feather, 17-1/2 x 21", DT 7210-160-0373	7	23	31.5	3.85
6	Sheet, bed, 72 x 102", DF 7210-171-1096	28	35	2.8	49.00
7	Pillowcase, preshrunk, 20-1/2 x 32-1/2", DT 7210-171-1100	14	7	1.4	7.00
8	Blanket, bed, gray, officer's, 66 x 86", DT 7210-171-1083	14	105	10.5	113.40
9	Bedspread, blue & white, 56 x 88", Type X, DT 7210-543-6910	7	23	2.1	21.70
10	Table lamp	9	72	18.0	94.50
	TOTAL		<u>941</u>	<u>181.3</u>	<u>655.08</u>



DISPENSARY  
Outfitting

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
1	Partition Panel P-1	9	792	54.0	900.00
2	Partition Panel P-2	19	1,672	114.0	1,900.00
3	Partition Panel P-3	8	704	48.0	800.00
4	Partition Panel P-4	3	264	18.0	300.00
5	Partition Panel P-6	1	113	6.0	110.00
6	Partition Panel P-7R	4	452	24.0	440.00
7	Partition Panel P-7L	5	565	30.0	550.00
8	Partition Panel P-10	1	113	6.0	110.00
9	Heating duct	1	80	50.0	160.00
10	Drop ceiling in hallway	1	80	10.0	100.00
11	Electrical system and fixtures	1	225	26.0	500.00
12	Accordion-fold door, opening 7'3" H x 7'8-1/2"W	1	92	8.0	108.56
13	Fire extinguisher, dry-chemical, hand type, 9C-4210-808-4545	1	50	2.0	75.00
14	Bed, shore, steel gray, 36"W x 79"L, 7105-269-5292	1	134	12.5	25.90

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
15	Wardrobe, metal, gray, double-door, 84" H x 36"W x 24"D, 7105-269-9217, Size 2	4	232	9.0	78.40
16	Chair, straight, w/arms, upholstered, 7110-273-8782	1	20	10.0	20.00
17	Chair, folding, upholstered, 7105-205-1050	6	126	15.0	48.00
18	Table, metal top, linoleum-covered, one drawer, 36" L x 24"W x 30-1/2"H, 7110-264-5227	1	30	6.0	20.00
19	Desk, flat-top, steel, gray, 60" L x 34"W x 30-1/2"H, 7110-270-9840	1	275	40.0	124.95
20	Filing cabinet, cap size, steel, 5 drawers, key lock, 57-1/2"H x 28"D x 18"W, 7110-292-4386	1	169	6.0	79.95
21	Bookcase, wood, 3 shelves, w/base, 26"W x 50"H x 11"D, 7110-273-9615	1	22	10.0	11.95
22	Worktable, enclosed base, 24"W x 34" H x 5' L	2	550	40.0	400.00
23	Worktable, open base, 24"W x 34" H x 6' L	1	190	40.0	140.00
24	Shelving, metal, gray, adjustable, 7 shelves, 48"W x 12"D x 75"H, Class 2, 7125-559-6378	1	54	4.0	15.07
25	Bed, adjustable, L6530-299-8700	3	270	31.0	231.06
26	Cabinet, bedside, L6530-299-8293	3	130	9.2	93.00
27	Table, overbed, L6530-598-5701	1	85	6.0	40.00

Item No.	Description	Quantity	Weight (lb)	Cube (#3)	Cost (\$)
28	Cabinet, medicine, combination, L6530-702-9240	1	400	40.0	345.00
29	Sterilizer, surgical instrument and dressing, L6530-597-0494	1	36	1.4	137.00
30	Incubator, bacteriological, L6640-428-9120	1	225	19.5	251.94
31	Centrifuge, laboratory, L6640-412-9450	1	29	2.9	60.74
32	X-ray film illuminator, L6525-604-0000	2	27	3.2	40.80
33	Tank, master, X-ray film processing, L6525-299-9538	1	297	13.0	758.00
34	X-ray film drier, portable, L6525-664-0858	1	55	8.0	103.00
35	Cabinet, medicine, combination, L6530-708-2715	1	257	33.6	193.60
36	Light, surgical, field, L6530-706-6325	1	124	5.6	94.24
37	Table, surgical instrument and dressing, L6530-710-0305	1	245	43.4	180.00
38	Stand, surgical instrument, L6530-708-1590	1	75	10.9	58.00
39	Sterilizer, surgical dressing, L6530-708-3878	1	604	51.0	1,210.00
40	X-ray apparatus set, radiographic, L6525-612-5200	1	395	10.0	1,466.00
41	Chest X-ray film, protective, L6525-601-2124	1	80	6.5	107.00
42	Holder, radiographic film, L6525-299-8300	1	45	3.5	20.20
43	Resuscitator, portable, LL6515-NS	1	70	2.0	450.00
44	Stool, revolving, L6530-708-8000	1	31	4.2	30.00

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
45	Scale, platform, L6670-788-9000	1	110	5.4	38.50
46	Table, operating, field, L6530-709-8175	1	155	10.7	831.00
47	Safe, 4 handles, modified M1942, 15"W x 15"D x 24"H, 7110-248-9306	1	125	8.0	57.95
48	Refrigerator, 7.6-cu-ft, Type 1, Size B, Grade C	1	200	30.0	228.00
49	Toilet unit, recirculating flush type	1	125	12.0	1,100.00
50	Lavatory	1	17	1.5	95.00
51	Bathtub	1	150	20.0	400.00
52	Pump, centrifugal, 6 gpm at 4-foot head	1	10	1.0	16.00
53	Scrub sink	1	112	2.0	214.50
54	Sink, laboratory	2	32	3.0	121.50
55	Plumbing, supply and waste lines inside the building	1	250	65.0	350.00
	TOTAL		11,770	1,052.0	16,339.81

DISPENSARY  
Allowance List

Item No.	Description	Quantity	Weight (lb)	Cube (#3)	Cost (\$)
1	Mattress, bed, L7210-716-0705	3	53	10.6	133.50
2	Light, bed, L6230-706-0575	3	6	0.4	24.00
3	Pillow, bed, chicken-feather, 17-1/2 x 21", DT 7210-160-0373	3	9	1.6	1.65
4	Sheet, bed, 72 x 102", DF 7210-171-1096	30	38	3.3	53.00
5	Pillowcase, preshrunk, 20-1/2 x 32-1/2", DT 7210-171-1100	15	8	1.5	7.50
6	Blanket, bed, gray, officer's, 66 x 86", DT 7210-171-1083	6	48	4.8	49.80
7	Blackout curtains	5	8	0.7	5.00
8	Safelight, darkroom, photographic, L6525-612-7840	1	8	0.5	14.90
9	Litter, folding, folding pole, L6530-783-7205	2	25	1.3	37.92
10	Litter, rigid, stakes, L6530-783-7810	1	44	5.4	39.82
11	Light, microscopic, L6650-428-7040	1	8	0.6	30.00
12	Microscope, optical, L6650-431-5000	1	30	1.5	219.04
13	Balance, prescription, L6670-401-8400	1	25	2.5	67.76
14	Weight set, balance, L6670-401-8850	1	1	0.1	3.08

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
15	Waste receptacle, L7240-788-3953	2	12	2.0	62.00
16	Dispenser, surgical-detergent, L6530-299-8114	1	5	0.3	18.70
17	Distilling apparatus, laboratory, 6640-440-4832	1	74	7.5	125.00
TOTAL			<u>402</u>	<u>44.6</u>	<u>892.67</u>

OFFICERS' QUARTERS (6 Rooms)  
Outfitting

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
1	Partition Panel P-1	8	704	48.0	800.00
2	Partition Panel P-2	18	1,584	108.0	1,800.00
3	Partition Panel P-3	6	528	36.0	600.00
4	Partition Panel P-7R	3	339	18.0	330.00
5	Partition Panel P-7L	3	339	18.0	330.00
6	Partition Panel P-9	1	113	6.0	110.00
7	Partition Panel P-11	1	113	6.0	110.00
8	Heating Duct	1	80	50.0	160.00
9	Drop ceiling in hallway and lounge	1	80	10.0	100.00
10	Electrical system and fixtures	1	225	26.0	500.00
11	Fire extinguisher, dry-chemical, hand type, 9Y-4210-679-2663	1	50	2.0	75.00
12	Bed, shore, steel, gray, 36"W x 79"L, GF 7105-269-5292	6	87	75.0	155.40
13	Wardrobe, metal, gray, double-door, 84"H x 36"W x 24"D, Size 2, 7105-269-9217	6	1,392	54.0	470.40
14	Table, metal top, linoleum-covered, one drawer, 36"L x 24"W x 30-1/2"H, 7110-264-5227	6	180	36.0	120.00

Item No.	Description	Quantity	Weight (lb)	Cube (#3)	Cost (\$)
15	Chair, straight, w/arms, upholstered, 7110-273-8782	12	240	120.0	240.00
16	Davenport, tubular aluminum, removable cushions, 7105-705-4100	2	220	60.0	300.00
17	Chair, w/arms, removable cushions, 7105-141-5385	3	81	36.0	210.00
18	Table, occasional, formica top, 30" L x 18"W x 22"H, w/shelf, 7105-270-6107	3	81	18.0	60.00
19	Table, metal top, linoleum-covered, one drawer, 60" L x 34"W x 30-1/2"H, 7110-262-6666	1	50	15.0	35.00
20	Chair, folding, upholstered, 7105-205-1050	10	210	25.0	80.00
	TOTAL		<u>6,696</u>	<u>767.0</u>	<u>6,585.80</u>



OFFICERS' QUARTERS (6 Rooms)  
Allowance List

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
1	Blackout curtains	14	21	2.0	14.00
2	Rug, cotton, 30 x 54"	6	30	3.0	22.62
3	Rug, cotton, 4 x 6'	2	18	1.0	15.94
4	Mattress, bed, innerspring, built-in berth type, 34-1/2 x 76 x 6-1/2", DT 7210-263-8580	6	516	93.0	232.80
5	Pillow, bed, chicken-feather, 17-1/2 x 21", DT 7210-160-0373	6	20	27.0	3.30
6	Sheet, bed, 72 x 102", DF 7210-171-1096	24	30	2.4	42.00
7	Pillowcase, preshrunk, 20-1/2 x 32-1/2", DT 7210-171-1100	12	6	1.2	6.00
8	Blanket, bed, gray, officer's, 66 x 86", DT 7210-171-1083	12	90	9.0	97.20
9	Bedspread, Type X, blue & white, 56 x 88", DT 7210-543-6910	6	20	1.8	18.60
10	Table lamp	9	72	18.0	94.50
	TOTAL	823		158.4	546.96

OFFICERS' QUARTERS (8 Rooms)  
Outfitting

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
1	Partition Panel P-1	8	704	48.0	800.00
2	Partition Panel P-2	20	1,760	120.0	2,000.00
3	Partition Panel P-3	7	704	42.0	700.00
4	Partition Panel P-4	3	264	18.0	300.00
5	Partition Panel P-7R	8	904	48.0	880.00
6	Partition Panel P-9	1	113	6.0	110.00
7	Coat hanger, 1 x 4 x 12', thirteen 3" wire coat hooks Type F1173	1	3	0.3	0.75
8	Heating duct	1	80	50.0	160.00
9	Drop ceiling in hallway	1	40	5.0	50.00
10	Electrical system and fixtures	1	225	26.0	500.00
11	Fire extinguisher, dry-chemical, hand type, 9Y-4210-679-2663	1	50	2.0	75.00
12	Bed, shore, steel, gray, 36"W x 79"L, GF 7105-269-5292	8	116	100.0	207.20

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
13	Wardrobe, metal, gray, double-door, 84"H x 36"W x 24"D, Size 2, 7105-269-9217	9	2,088	81.0	705.60
14	Table, metal top, linoleum-covered, one drawer, 36"L x 24"W x 30-1/2"H, 7110-264-5227	8	240	48.0	160.00
15	Chair, straight, w/arms, upholstered, 7110-273-8782	16	320	160.0	320.00
	TOTAL		<u>7,611</u>	<u>754.3</u>	<u>6,968.55</u>

OFFICERS' QUARTERS (8 Rooms)  
Allowance List

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
1	Blackout curtains	14	21	2.0	14.00
2	Rug, cotton, 30 x 54"	7	35	3.5	64.09
3	Rug, cotton, 4 x 6'	2	18	1.0	15.94
4	Mattress, bed, innerspring, built-in berth type, 34-1/2 x 76 x 6-1/2", DT 7210-263-8580	8	688	124.0	309.60
5	Pillow, bed, chicken-feather, 17-1/2 x 21", DT 7210-160-0373	8	27	36.0	4.40
6	Sheet, bed, 72 x 102", DF 7210-171-1096	32	40	3.2	56.00
7	Pillowcase, preshrunk, 20-1/2 x 32-1/2", DT 7210-171-1100	16	8	1.6	4.00
8	Blanket, bed, gray, officer's, 66 x 86", DT 7210-171-1083	16	120	12.0	129.60
9	Bedsread, Type X, blue & white, 56 x 88", DT 7210-543-6910	8	26	2.4	24.80
10	Table lamp	8	64	16.0	84.00
TOTAL			<u>1,047</u>	<u>201.7</u>	<u>706.43</u>

ADMINISTRATION  
Outfitting

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
1	Partition Panel P-1	8	704	48.0	800.00
2	Partition Panel P-2	18	1,584	108.0	1,800.00
3	Partition Panel P-3	7	616	42.0	700.00
4	Partition Panel P-4	2	176	12.0	200.00
5	Partition Panel P-7R	7	791	42.0	770.00
6	Partition Panel P-9	1	113	6.0	110.00
7	Heating duct	1	80	50.0	160.00
8	Drop ceiling in hallway	1	80	10.0	100.00
9	Electrical system and fixtures	1	225	26.0	500.00
10	Fire extinguisher, dry-chemical, hand type, 9C-4210-808-4545	1	50	2.0	75.00
11	Desk, flat-top, steel, gray, 60"L x 34"W x 30-1/2"H, 7110-270-9840	4	1,100	160.0	499.80
12	Chair, rotary, w/arms, upholstered, w/casters, 7110-273-8793	4	212	48.0	199.80
13	Desk, typist's, steel, gray, 60"L x 34"W x 30-1/2"H, 7110-270-9838	5	1,375	200.0	749.75

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
14	Chair, rotary, w/o arms, upholstered, w/ casters, 7110-273-8798	5	140	50.0	99.75
15	Chair, folding, upholstered, 7105-205-1050	16	336	40.0	128.00
16	Filing cabinet, cap size, steel, 5 drawers, key lock, 57-1/2"H x 28"D x 18"W, 7110-292-4386	9	1,521	54.0	719.55
17	Bookcase, wood, 3 shelves, w/base, 26"W x 50"H x 11"D, 7110-273-9615	7	154	70.0	83.65
18	Safe, 4 handles, modified M1942, 15"W x 15"D x 24"H, 7110-248-9306	1	125	8.0	57.95
19	Table, metal top, linoleum-covered, 2 drawers, 72"L x 30"W x 30"H, 7110-285-2409	3	150	45.0	105.00
20	Shelving, metal, gray, adjustable, 7 shelves, 48"W x 18"D x 75"H, Class 2, 7125-559-6378	2	138	12.0	40.94
21	Shelving, metal, gray, adjustable, 7 shelves, 48"W x 24"D x 75"H, Class 2, 7125-559-6378	6	648	48.0	180.84
TOTAL			10,318	1,081.0	8,080.03

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
1	Partition Panel P-1	6	528	36.0	600.00
2	Partition Panel P-2	8	704	48.0	800.00
3	Partition Panel P-3	4	352	24.0	400.00
4	Partition Panel P-5	1	113	6.0	110.00
5	Partition Panel P-7L	2	226	12.0	220.00
6	Partition Panel P-7R	1	113	6.0	110.00
7	Partition Panel P-9	1	113	6.0	110.00
8	Partition Panel P-10	1	113	6.0	110.00
9	Heating duct	1	80	50.0	160.00
10	Drop ceiling	1	240	30.0	300.00
11	Electrical system and fixtures	1	225	26.0	500.00
12	Fire extinguisher, dry-chemical, hand type, 9C-4210-808-4545	2	100	4.0	150.00
13	Desk, flat-top, steel, gray, 60"L x 34"W x 30-1/2"H, 7110-270-9840	1	275	40.0	124.95
14	Chair, rotary, w/arms, upholstered, w/casters, 7110-273-8793	1	53	12.0	49.95

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
15	Desk, typist's, steel, gray, 60"L x 34"W x 30-1/2"H, 7110-270-9838	1	275	40.0	149.95
16	Chair, rotary, w/o arms, upholstered, w/ casters, 7110-273-8798	1	28	10.0	19.95
17	Chair, folding, upholstered, 7105-205-1050	6	126	15.0	48.00
18	Filing cabinet, cap size, steel, 5 drawers, key lock, 57-1/2"H x 28"D x 18"W, 7110-292-4386	2	338	12.0	159.90
19	Bookcase, wood, 3 shelves, w/base, 26"W x 50"H x 11"D, 7110-273-9615	2	44	20.0	23.90
20	Table, metal top, linoleum-covered, one drawer, 36"L x 24"W x 30-1/2"H, 7110-264-5227	1	30	6.0	20.00
21	Shelving, metal, gray, adjustable, 7 shelves, 48"W x 18"D x 75"H, Class 2, 7125-559-6378	4	276	24.0	81.88
22	Shelf, 3/4" plywood 1'6" x 3'3", 2 Type F1068 shelf brackets	1	10	2.0	2.00
23	Window closure, 3/4" plywood 3'3" x 3'4-1/4", 4 Type F1062 4" surface bolts w/screws	1	36	4.0	5.50
TOTAL			4,398	439.0	4,255.98



## ERECTION AIDS

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
1	Transit, mountain, w/folding tripod	1	95	9.0	600.00
2	Compass, prismatic	2	2	0.1	67.00
3	Tape, 100'	3	13	0.1	33.60
4	Stakes	100	30	1.0	5.00
5	Crowbar, 5'	4	20	0.2	8.00
6	Bolt cutter, 24"	2	4	0.3	5.00
7	Nail puller	4	4	0.1	4.00
8	Ripsaw, 5-1/2-point	2	6	0.2	12.00
9	Crosscut saw, 8-point	4	12	0.5	24.00
10	Skill saw, 8"	2	54	3.0	130.00
11	Square, framing	4	8	0.2	20.00
12	Rule, 10'	6	3	0.1	12.00
13	Pencil, carpenter's	20	1	0.1	1.00
14	Hammer, claw	10	20	0.5	48.20
15	Chisel, two 3/4", two 1-1/2"	4	2	0.1	7.60
16	Brace and bit, wood	2	10	0.3	27.50
17	Plane, smoothing	2	10	0.2	14.80

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
18	Pliers, needlenose, 7"	6	6	0.2	9.00
19	Hacksaw frame, w. 6" blade	2	4	0.2	4.64
20	Hatchet, w 18" handle	4	8	0.2	20.00
21	Pliers, regular, 7"	12	9	0.2	18.00
22	Screwdriver, 6", 8", and 10"	12	6	0.2	9.60
23	Sheet-metal snips	2	4	0.1	4.14
24	Level, 24"	6	10	0.5	28.08
25	C-clamp, 4"	4	9	0.1	5.40
	C-clamp, 6"	4	12	0.3	7.40
	C-clamp, 8"	4	18	0.5	12.32
26	Open-end wrench set, 1/4" to 1"	6	21	0.7	47.46
27	Keyhole saw	2	2	0.2	6.18
28	Pipe vise, w/legs	1	22	3.0	3.70
29	Pipe threader	1	18	2.0	28.80
30	Pipe reamer	1	1	0.5	4.21
31	Pipe cutter	1	6	0.5	14.45
32	Cutting oil	1 pt	2	0.1	1.44
33	Pipe wrench for 1/2" to 1-1/2" steel pipe	3	15	0.2	16.14

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
34	Cutting and flaring kit for copper tubing (45°)	1	8	1.0	7.56
35	Tube bender, wide-range, lever type	1	20	2.0	23.75
36	Crescent wrench for tube nuts	4	3	0.1	8.00
37	Power drill, w/bits for steel and aluminum	2	25	2.0	125.00
38	Step ladder, 6'	4	48	48.0	65.76
39	Shovel, pointed, long-handle	6	30	12.0	27.00
40	Shovel, square, long-handle	6	30	12.0	27.00
41	Rope, 1/2" dia, manila	1 bale	50	2.0	10.00
42	Sledgehammer	2	20	0.2	6.00
43	Mallet, 8-lb	2	20	0.5	7.00
44	Butane torch, w/straight and ring-type burners	1	9	1.0	8.98
45	Wire brush, 14 x 1" hardwood handle	3	2	0.1	1.35
46	Solid-wire solder, 50% tin, 50% lead, 1-lb spool	30	48	1.0	29.40
47	Noncorrosive flux	10 lb	15	1.0	8.50
48	Wire, #16	100 ft	80	6.0	2.40
	Wire, #9	100 ft	100	6.0	2.90

Item No.	Description	Quantity	Weight (lb)	Cube (ft <sup>3</sup> )	Cost (\$)
49	Common nails, 6d	10 lb	10	0.2	1.90
	Common nails, 8d	10 lb	10	0.2	1.90
	Common nails, 16d	10 lb	10	0.2	1.90
50	Wood screws, #8 x 1"	24 doz	2	0.1	7.70
	Wood screws, #10 x 2"	24 doz	2	0.1	16.76
	Wood screws, #12 x 3"	24 doz	2	0.1	31.96
51	Carrage bolts, w/washer and nut, 3/8" $\phi$ x 2"	10 doz	3	0.4	6.38
	Carrage bolts, w/washer and nut, 1/2" $\phi$ x 3"	10 doz	30	0.6	12.30
52	Machine bolts, w/nut, 1/2" $\phi$ x 2"	10 doz	25	0.4	9.96
	Machine bolts, w/nut, 1/2" $\phi$ x 3"	10 doz	30	0.6	12.30
	Machine bolts, w/nut, 5/8" $\phi$ x 4"	10 doz	40	0.8	14.20
	Machine bolts, w/nut, 5/8" $\phi$ x 6"	10 doz	48	1.0	19.20
53	Sheet-metal screws, #8 x 1/2"	1 gross	1	0.1	0.84
	Sheet-metal screws, #8 x 3/4"	1 gross	1	0.1	0.96
	Sheet-metal screws, #8 x 1"	1 gross	2	0.2	1.08
	TOTAL		1,191	125.7	1,760.60

## Appendix C

### COMMUNICATIONS EQUIPMENT FOR POLAR CAMPS

*A report on communications equipment required for pioneer polar camps was prepared by K. E. Stone, Office of Assistant Industrial Manager, Electronics Division, General Activities Branch, U. S. Naval Base, San Diego, California. This equipment could be used in any type of polar camp; therefore the report, which follows, is presented for guidance in outfitting the temporary polar camp.*

The operational communications requirements of individual Pioneer Polar Camps depends upon the assigned mission and location of the camp and are established by the Chief of Naval Operations. Because of wide variations in the planned needs of polar camps it is not feasible to engineer the ultimate communications facility to meet the operational requirements for all locations and missions which may be assigned; however, the scope of communications circuits requirements can be identified to four areas as follows:

1. Base communications
2. Air/ground communications
3. Point-to-point communications
4. Ship/shore communications

Electronic and ancillary equipments to provide communications in each of the four areas can be arranged in complete basic communication groups. These equipment groups can then be combined and installed in such a manner as to provide a complete communications system capable of meeting the operational requirements established by the Chief of Naval Operations for any type or size of Pioneer Polar Camp.

The basic equipment groups in each of the four areas are:

#### Area #1 BASE COMMUNICATIONS

Communications in the general area of the Pioneer Camp will be provided by fixed station equipments operating in the HF range, and capable of communicating with tractors. Individual personnel or groups can be supplied with portable equipment to provide communication in the UHF range. Tractor units will carry direction-finding equipment to receive the homing beacon signals.

## Area #2 AIR/GROUND COMMUNICATIONS

Operational capabilities in the VHF/UHF ranges and radio homing beacons will be required. The homing beacons will provide navigational assistance for aircraft, and for tractors operating in remote areas.

## Area #3 POINT-TO-POINT COMMUNICATIONS

A point-to-point communications system provides a means of communication between a remote polar camp and its base of operations. Suitable transmitters and associated receivers capable of O. 1A1/6A3/3A3j emission and reception in the HF range will meet the current requirements for this type of service.

## Area #4 SHIP/SHORE COMMUNICATIONS

Electronic equipments normally used for point-to-point communications will provide ship/shore communications.

Sub-zero temperatures and climatic conditions associated with them affect the efficient operation of electronic equipments. Instructions and precautions for operation under such adverse conditions follow.

When equipment has been exposed to cold and brought into a warm room, moisture will condense on it until the equipment reaches room temperature. This condition can also develop when the room or shelter warms up after a cold night. When the equipment has reached room temperature, dry it thoroughly. The best way to dry equipment is to turn them on and let their own heat provide the drying action. Under conditions of extreme cold, allow a one-hour warm-up time to stabilize the circuits. Leave all crystal oven switches in the ON position to help maintain frequency stability.

Extreme cold, high winds and dampness requires the use of extra bracing on antenna masts and secure fastenings on all wires and cables. The use of moisture- and weather-resistant connectors and cables is necessary to assure reliability of operation.

Detailed information in regard to the mechanical details of antenna installation can be obtained from numerous sources including Equipment Instruction Books, Electronics Installation Practices Manual (NAVSHIPS 900171), and Shipboard Antenna Details (NAVSHIPS 900121). All antennas at fixed locations should be provided with safety spark gaps.

The following tables list pertinent information relative to shipping weight, space, power requirements, etc., for the equipment.

# R-390A/URR RADIO RECEIVER

Quantity: 1 each

Stock number: Order by type number

Frequency range: 0.5-32 mc

Intended use: Point-to-point communications from Pioneer Camp to ships and base

Number of boxes: 3 (estimated)

Shipping weight: 100 lb

Shipping volume: 3.4 cu ft

Power requirements: 115 or 230 VAC, 60 cps, 225 watts

Items required but not supplied:

- (1) Connector plug, UG-573/U
- (1) Antenna, 75 ft horizontal copperweld #6
- (1) Headset, Navy Type CW-49507 or equivalent
- (1) Loudspeaker, 600-ohm Navy type
- (1) Adaptor connector, UG-970/U or UG-971/U
- (1) Cord, CX-1334/U or equivalent
- (1) Electrical cabinet, CY-917/URR

Estimated man-hours for installation: 4 hours

Special test equipment required: None

Crystals required:

- (1) CR-45/U
- (1) 1N198
- (1) CR-36/U

Instruction book: TM 11-856A

Approximate cost: \$2210.00 with spares

Tube complement:

(1) 0A2	(1) 2625W
(1) 3TF7	(1) 6AK5
(1) 6AK6	(2) 63A6W
(1) 6C4	(2) 5184A
(1) 6DC6	(5) 3-amp, 125-volt fuses

## AN/URT-17A TRANSMITTER

Quantity: 1 each

Stock number: F5820-681-9875

Frequency range: 2-32 mc

Intended use: Point-to-point communications from Pioneer Camp to ships and base

Number of boxes: 7 (estimated)

Shipping weight: 1425 lb (transmitter)  
85 lb (antenna tuning system), (approximate)  
38 lb (remote-control amplifier)

Shipping volume: 81 cu ft (transmitter)

Power requirements: 2700 watts maximum (estimated)

Items required but not supplied: (1) AN/URA-27 antenna tuning system, P5985-709-7984  
(1) 35-ft whip antenna, NT-66047  
(1) RTC remote-control amplifier  
(1) MK-102 (Electrovoice 605) or MK-103 (Shure 51) microphone (dynamic)

Estimated man-hours for installation: 40 hours

Special test equipment required: None

Crystals required: (1) CR18/U in NC6/U holder

Instruction book: NAVSHIPS 93161

Approximate cost: \$4800.00

Tube complement:*	(2) 4-250-A	(2) 0B2	(2) 810
	(2) 6C4	(1) 6X4	(1) 0A3
	(4) 12AU7	(3) 5R4GY	(1) 12AX7
	(1) 0A2	(2) 872A	(1) 5Y3
	(1) 6AH6	(3) 12AT7	(1) 4HTF4
	(1) 6BE6	(2) 6L6	

\* Tube complement includes transmitter, modulator, and power supply only.



CV-591A/URR SSB CONVERTER

Quantity: 1 each

Stock number: F5820-543-1593 w/s

Frequency range: 452-458 kc

Intended use: Single sideband converter for use with R-390/URR receiver

Number of boxes: 1

Shipping weight: 30 lb

Shipping volume: 2.5 cu ft

Power requirements: 110/220 VAC, 60 cps, 65 watts

Items required but not supplied: None

Estimated man-hours for installation: 2 hours

Special test equipment required: None

Crystals required: None

Instruction book: NAVSHIPS 93210

Approximate cost: \$535.00

Tube complement:	(2) 12AU7	(2) 6BE6
	(1) 12AT7	(1) 6AL5
	(1) 6J6	(1) 6AQ5
	(1) 6AG5	(1) SY3
	(1) 6BA6	(1) 0A2

AN/URT-7D VHF TRANSMITTER

Quantity: 1 each

Stock number: F5820-713-3939

Frequency range: 115-156 mc

Intended use: Ground-to-air communications

Number of boxes: 1

Shipping weight: 186 lb

Shipping volume: 6.4 cu ft

Power requirements: 115 or 230 VAC, 1  $\phi$ , 50-60 cps, 750 watts

Items required but not supplied: (1) NT-23500 remote radiophone unit  
(1) NT-66095 antenna assembly

Estimated man-hours for installation: 4 hours

Special test equipment required: None

Crystals required: (4) CR-24U

Instruction book: NAVSHIPS 91684

Approximate cost: \$1440.00

Tube complement:	(3) 12AT7	(2) 807
	(1) 6AT6	(4) 12AU7
	(2) 3B28	(2) 5726/6AL5
	(3) 4X150A	(1) 5749/6BA6

#### AN/URR-35C UHF RECEIVER

Quantity: 1 each

Stock number: Not listed for C model — order by type number

Frequency range: 225-400 mc

Intended use: Ground-to-air communications

Number of boxes: 1

Shipping weight: 86 lb

Shipping volume: 4.3 cu ft

Power requirements: 115 VAC, 60 cps, 108 watts

Items required but not supplied: (1) Headset, HS-33 or HS-38 or HS-18 or HS-23  
(1) Antenna, AS-390 or AT-150

Estimated man-hours for completion: 4 hours

Special test equipment required: None

Crystals required: (1) CR-23U  
(1) CR-24U

Instruction book: NAVSHIPS 92676

Approximate cost: \$735.00

Tube complement: (1) 6626/0A2WA (2) 5726/6AL5W  
(1) 6AK6 (1) 5931  
(1) 6627/0B2WA (10) 5654/6AK5  
(5) 5670

#### TED-9 VHF TRANSMITTER

Quantity: 1 each

Stock number: F5820-553-6813

Frequency range: 225-400 mc

Intended use: Ground-to-air communications

Number of boxes: 1

Shipping weight: 212 lb

Shipping volume: 8.4 cu ft

Power requirements: 115/230 VAC, 50-60 cps, 75 watts

Items required but not supplied: Antenna, Navy Type AS-390/SRC

Estimated man-hours for installation: 8 hours

Special test equipment required: None

Crystals required: (4) CR-24U

Instruction book: Order by equipment type

Approximate cost: \$1400.00

Tube complement:	(4) 5814A	(1) 5749/6BA6W
	(2) 5726/6AL5W	(2) 5933
	(3) 12AT7WA	(1) 6AT7
	(3) 4X150A	(2) 3828

#### AN/URN-5 RADIO BEACON SET

Quantity: 1 each

Stock number: F5825-665-1462 w/s

Frequency range: 200-800 kc

Intended use: Ground-to-air communications-navigation system

Number of boxes: 18

Shipping weight: 7042 lb

Shipping volume: 332.2 cu ft

Power requirements: 115 VAC, 1  $\phi$ , 3 kva (transmitter)  
115 VAC, 1  $\phi$ , 50 watts (control unit)

Items required but not supplied:

- (1) Crystal, CR-26U
- (1) RMT radio-phone unit, NT-23500
- (1) Hand telephone, NT-51081
- (1) Cable assembly, CX-1826/U
- (1) Cable assembly, CX-1827/U
- (1) Cable assembly, CX-3154/U
- (1) Antenna, AS-390/SRC

Estimated man-hours for installation: 40 hours

Special test equipment required: None

Crystals required: (1) CR-26U

Instruction book: NAVSHIPS 91766

Approximate cost: \$9000.00

Tube complement:	(4) VR-105/0C3	(1) 6H6
	(3) VR-150/0D3	(2) 6L7
	(2) 4B32	(1) 6SH7
	(1) 4-400A	(5) 6SJ7
	(3) 5U4G	(2) 6SN7GT
	(1) 5670	(1) 6X5GT
	(1) 6AC7	(1) 807

Notes: Location of equipment requires 200-foot clearing for erection of horizontal member of antenna. Shelter (included) should be located at center of clearing and should be held at an internal ambient temperature of 40 F (min.) at all times. Antenna kit is included, but will require modification (strengthen).

#### AN/URR-27A VHF RECEIVER

Quantity: 1 each

Stock number: F5820-665-3826 w/s

Frequency range: 105-190 mc

Intended use: Ground-to-air communications

Number of boxes: 2 (estimated)

Shipping weight: 166.5 lb

Shipping volume: 7.4 cu ft

Power requirements: 115 VAC, 60 cps, 1  $\phi$ , 120 watts

Items required but not supplied: (1) Crystal, CR-24U  
(1) Headset, HS-33 or HS-38 or HS-18 or HS-23  
(1) Antenna, NT-66095

Estimated man-hours for installation: 4 hours

Special test equipment required: None

Crystals required: (1) CR-24U

Instruction book: NAVSHIPS 91771

Approximate cost: \$1200.00

Tube complement:	(1) 0A2WA	(4) 9003
	(1) 5670	(1) 5U4
	(1) 6J6WA	(1) 5749/6BA6W
	(1) 0B2WA	(9) 5654/6AK5W
	(2) 5726/6AL5W	(1) 6AK5

#### FIXED STATION TRANSCEIVER

Quantity: 1 each

Stock number: Collins KWM-2A Transceiver

Frequency range: 3.5-29.7 mc

Intended use: Primary communications between camp and tractor units

Number of boxes: 4 (estimated)

Shipping weight: 21 lb (transmitter)  
39 lb (power supply)

Shipping size: 9" x 16" x 15" (transmitter)  
7" x 13" x 9" (power supply)

Power requirements: 115 VAC

Items required but not supplied: (1) Headset-mike combination, Telex BRW-01  
(1) Cord set for above, Telex CBE-54  
(1) Antenna tuner, Collins 180S-1  
(1) Whip antenna, NT-66047

Estimated man-hours for installation: 4 hours

Special test equipment required: None

Crystals required: Consult manufacturer

Instruction book: Collins

Approximate cost: \$1150.00 (transceiver)  
\$115.00 (power supply)  
\$32.00 (headset)  
\$8.00 (cord for headset)  
\$640.00 (antenna tuner)

Tube complement: Consult manufacturer

#### MOBILE TRANSCEIVER

Quantity: 1 per tractor

Stock number: Collins KWM-2A Transceiver

Frequency range: 3.5-29.7 mc

Intended use: Primary communications between tractor and base station

Number of boxes: 4 (estimated)

Shipping weight: 21 lb (transmitter)  
12 lb (mounting base)  
17 lb (power supply)

Shipping size: 9" x 16" x 15" (approximately), (transceiver)  
7" x 13" x 9" (approximately), (power supply)

Power requirements: 12 VDC

Items required but not supplied: (1) Headset-mike combination, Telex BRW-01  
(1) Cord set for above, Telex CBE-54  
(1) Mobile mount base, Collins 351D-2  
(1) Whip antenna, NT-66047

Estimated man-hours for installation: 8 hours

Special test equipment required: None

Crystals required: Consult manufacturer

Instruction book: Collins

Approximate cost: \$1150.00 (transceiver)  
\$270.00 (12-VDC supply)  
\$120.00 (mobile mount)

Tube complement: Consult manufacturer

AN/PRC-17 TRANSCEIVER ("WALKIE-TALKIE")

Quantity: 1 each

Stock number: Order by type number

Frequency range: 121.5-243 mc

Intended use: Provides UHF communications between base camp, tractors, aircraft, ships, and personnel located remotely from any of the above

Number of boxes: 1 (estimated)

Shipping weight: 15 lb

Shipping volume: 2 cu ft

Power requirements: Battery operated — see technical manual for type

Items required but not supplied: (1) 1.1-1.35-volt A battery  
(1) 135-volt B battery

Estimated man-hours for installation: None

Special test equipment required: None

Crystals required: (1) CR-23/U

Instruction book: Technical Manual AN-16-30PRC17-4; Technical Manual for AN/PRC-17

Approximate cost: \$210.00

Tube complement: (1) 3V4                      (3) 6397  
(2) 5676                      (1) 6281



# AN/ARN-6 DIRECTION FINDER (RADIO COMPASS)

Quantity: 1 each

Stock number: F5826-642-8022

Frequency range: 100-1750 kc

Intended use: Tractor-mounted direction-finding radio compass designed to locate base camp under adverse conditions. Also provides LF and MF backup reception.

Number of boxes: 1

Shipping weight: 85 lb (approximate)

Shipping size: 8" x 12" x 48"

Power requirements: 26.5 VDC, 4 amps

Items required but not supplied:\*

- (1) Headset, HS-33 or HS-38 or HS-18 or HS-23
- (1) Coupling unit, CU-65/ARN-6
- (1) Loop, AS-313/ARN-6 or AS-313A/ARN-6 or AS-313B/ARN-6
- (1) Antenna (nondirectional), (whip or long wire)
- (1) Tuning shaft, MC-124
- (1) Plug, AN-3106-16S-1S
- (1) Plug, AN-3106-14S-2S
- (1) Cable clamp, AN-3057-6
- (1) Cable clamp, AN-3057-8
- (1) Receptacle, MRE-34S-G
- (1) Tuning meter, EA-112

Estimated man-hours for installation: 8 hours

Special test equipment required: None

Crystals required: None

Instruction book: AN-16-30ARN6-3

\* Total weight approximately 50 lb

Approximate cost: \$5000.00

Tube complement: (6) 12SK7 (1) 12SW7  
(4) 12SX7 (1) 26A7GT  
(1) 12SY7 (2) 2050

AM/ARR-40 RADIO RECEIVING SET

Quantity: 1 each

Stock number: Not listed — order by type number

Frequency range: 265–284.9 mc

Intended use: This tractor-mounted equipment is designed to provide automatic direction-finding on UHF transmissions from the Pioneer Camp, ships, and portable units. In addition, this unit provides UHF backup reception in case of failure of the primary communications system. Tractors will have to be equipped with 28-VDC primary power.

Number of boxes: 3 (estimated)

Shipping weight: 18 lb (approximate)

Power requirements: 28 VDC

Items required but not supplied: (1) Nondirectional UHF whip antenna

Estimated man-hours for installation: 8 hours

Special test equipment required: None

Instruction book: NAVAER 16-30ARR-40-502; Technical Manual for AN/ARR-40

Approximate cost: \$5000.00

Tube complement: (3) 5654/6AK5W (6) 6021  
(8) 5840 (1) 5902  
(2) 5896

AN/FRN-24

Quantity: 1 each

Stock number: Order by type number

Frequency range: 225-400 mc

Intended use: Ground-air radio beacon

Number of boxes: 5 (estimated)

Shipping weight: 850 lb (estimated) plus 275-lb antenna

Shipping volume: 40 cu ft (estimated)

Power requirements: 115 VAC, 60 cps, 950 watts

Items required but not supplied: (1) Antenna, AS-765/GR  
(2) NAVSHIPS 93137A Technical Manuals for antenna  
(2) Crystal units, CR-24/U

Estimated man-hours for installation: 40 hours

Special test equipment required: None

Crystals required: (2) CR-24/U

Instruction book: NAVSHIPS 93291

Tube complement:	(2) 5749/6BA6W	(2) 6AT6	(1) 12AX7
	(4) 3B28	(1) 6J6	(1) 6005
	(6) 4X150A	(8) 5814/12AU7	(4) 807
	(2) 5X3WGTB	(1) 12AT7WA	(4) 5726/6AL5W

RBG-2 RADIO RECEIVER, GENERAL-PURPOSE

Quantity: 1 each

Stock number: NT-46140

Frequency range: 0.54-31.0 mc

Intended use: General-purpose receiver

Number of boxes: 1

Shipping weight: 74 lb

Shipping volume: 10 cu ft (estimated)

Power requirements: 115 VAC, 60 cps, 95 watts

Items required but not supplied: None

Estimated man-hours for installation: 4 hours

Special test equipment required: None

Crystals required: (1) 455 kc

Instruction book: NAVSHIPS 900004

Tube complement:	(1) 0C3	(1) 65J7
	(1) 5U4	(1) 6V6Y
	(1) 6K8	(1) 6R6
	(4) GSK7WA	(1) 6C5

#### PU-286G GASOLINE-ENGINE GENERATOR SET

Quantity: 1 each

Frequency range: 60-cycle, 1  $\phi$

Intended use: Emergency power source. Output: 120 VAC, 60-cycle, 1  $\phi$ , 5-kw, 52.2-amp.

Number of boxes: 1

Shipping weight: 725 lb

Shipping size: 22" x 31" x 44"

Power requirements: Gasoline, 6-V storage battery

Items required but not supplied: None

Estimated man-hours for installation: 20 hours

Special test equipment required: None

Instruction book: TM 11-940A

#### MISCELLANEOUS

RG-141A/U 50-ohm Coax or equivalent

Insulation: Teflon

Temperature range: -73 C to 200 C

Manufacturer: Amphenol

Cost: \$1.22 per ft

Antenna Tower Type AB-158/GR, extended to 50 feet

Quantity: 5 each

Shipping weight: 770 lb

Instruction book: TM 11-5137

Antenna Tower, self-supporting in lieu of Type AB-158/GR above. Self-supporting type. Guaranteed to 80 mph.

Manufacturer: KTV Tower and Communications Equipment Company, Sullivan, Illinois

Quantity: 5 each

Items required but not supplied: Top section, #710-K  
Base plate, #867-H

CY-597/G Electrical Equipment Cabinet

Quantity: 2 each

Stock number: N5935-149-0517

Intended use: For housing equipment

#### RF DISTRIBUTION SYSTEMS

SB-83/SRT - (N5820-665-3600)

Shipping size: 6-13/16" x 9-1/4" x 16-5/8"

SB-82/SRR - (N5820-508-7802), Re: NAVSHIPS 900100

Shipping weight: 10 lb each

Shipping size: 5-1/8" x 7-1/4" x 9-1/2"

SB-346/8 - (N5820-665-1574) Re: NAVSHIPS 92137

Shipping weight: 22 lb

Shipping volume: 0.73 cu ft

Items required but not supplied: (3) Plugs, UG-573/U

NT-C-38A - Junction Box

NT-28007 - Lightning Arrestor

#### TEST EQUIPMENT

AN/URM-43B RF Wattmeter

Stock number: F6625-542-6617 w/s

Frequency range: 30-60 mc

Shipping weight: 12.5 lb

Shipping volume: 0.45 cu ft

Instruction book: NAVSHIPS 91842

AN/URM-25F RF Signal Generator

Stock number: F6625-519-2339 w/s

Frequency range: 10 kc to 50 mc

Shipping weight: 45 lb

Shipping volume: 1.6 cu ft

Crystals required: (2) 1N69

(2) 1N145

Instruction book: NAVSHIPS 92495

Tube complement: (1) 0A3

(5) 6AH6

(1) 6AG7Y

(1) 6X4WA

AN/PSM-4B Volt-Ohm Meter

Stock number: F6625-585-9795

Shipping volume: 0.5 cu ft (estimated)

Items required but not supplied: (1) 8A-30 battery

(1) BA-261/U battery

Instruction book: NAVSHIPS 92051

AN/URM-26B RF Signal Generator

Stock Number: F6625-648-8729 w/s

Shipping weight: 46 lb

Shipping volume: 1.8 cu ft

Crystals required: (1) 1N69

(1) 1N82

(1) CK710

Instruction book: NAVSHIPS 92890

Approximate cost: \$680.00

Tube complement: (2) 0B2WX

(1) 6X4WA

(1) 5814A

(1) 5726/6AL5W

(1) 5675

(1) 6005/6AQ5

## Appendix D

### DESIGN CONSIDERATIONS FOR PARTITIONS, TUNNELS, AND PASSAGEWAYS

#### SELECTION OF MATERIALS FOR PARTITION FABRICATION

The criteria for the temporary polar camp specify that outfitting for the camp will include maximum use of fire-resistant materials; therefore, the use of treated materials was considered for the partition design. Both plywood and styrofoam can be treated for fire resistance, but there are disadvantages to the treated materials which offset the fire protection received. Treated plywood often delaminates, so is structurally unsound. Treated styrofoam gives off toxic fumes when heated which, in many cases, are more dangerous than fire. These disadvantages indicate that untreated materials should be used in constructing the partitions.

The panels used in constructing the floor, walls, and roof of the basic building are all made of untreated plywood and insulated with fiberglass. There is little safety gained by having partitions which are more fire resistant than the building containing them.

#### SELECTION OF TUNNEL SIZE

Circular and oval sections were first considered for constructing the tunnels. The circular section has the advantage of being constructed of identical segments which can be easily nested for packaging. However, the circular section must be much wider than the oval section to provide adequate head room. Regardless of which section is used, a floor is required.

Since a floor is necessary, it is more practical to use pallets placed on the ground with an arch section over the pallets. The arch section must have slightly sloping sides in order for the sections to be nestable. The smallest radius to which the corrugated-aluminum sections can be rolled is 30 inches, resulting in a 5-foot-wide arch. The sides slope out to a base width of 5 feet 5 inches.

The tunnel does not have to be as wide as the passageway across the building as there are no doors opening into the tunnel, there is no cross-traffic, and there will be no lines forming in the tunnel.

## SELECTION OF PASSAGEWAY AND DOOR SIZES

Consideration of partition panel design revealed that the transverse partitions should be placed under the trusses which are supported at the center of exterior wall panels. Since 4 feet is not a sufficient width for this major passageway, the width had to be made 8 feet in order to conform to the 4-foot module. This width is not excessive as it must accommodate all of the camp traffic plus cross traffic and lines forming at such places as the post office and mess hall. The end of the passageway will contain one full wall panel and one-half of two other panels. Installation of a double door would require altering all three of these wall panels, which would be structurally detrimental to the building. Two separate doors were also considered, but this would require altering two panels to accommodate each door. The two doors would also require an excessively wide tunnel. Because of the impracticality of using double doors, it was decided to make a wall panel with a 3-foot-wide door to be used in place of the standard 2-foot, 8-inch-wide door. This would not only facilitate traffic flow, but would also provide an adequate entry for large furniture or equipment.



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